

CANADIAN  
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SERIES.

PROGRESSIVE PROBLEMS

—IN—

ARITHMETIC

—FOR—

FOURTH CLASSES AND ENTRANCE CANDIDATES

WHITE

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PROGRESSIVE PROBLEMS  
— IN —  
ARITHMETIC  
FOR  
FOURTH CLASSES IN PUBLIC SCHOOLS

AND  
*CANDIDATES FOR ENTRANCE TO HIGH SCHOOLS  
AND COLLEGIATE INSTITUTES.*

BY  
J. WHITE,  
*Author of Practical Problems in Arithmetic.*

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## PREFACE.

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This little work is intended to aid teachers in furnishing Fourth Classes, including Entrance Candidates, with practical exercise in Arithmetic.

In the preparation of the work, the general plan of *Practical Problems in Arithmetic* has been followed. It is hoped that the method adopted will lead pupils to deduce results from general principles, and, by so doing, to avoid the tendency to mechanical work.

J. WHITE.

EDMONTON, Ontario, 1894.



# PROGRESSIVE PROBLEMS —IN— ARITHMETIC

## FOURTH CLASS.

### Greatest Common Measure.

(*Including Previous Work.*)

#### I.

1. Resolve the following numbers each into a pair of integral factors :—8 ; 14 ; 15 ; 21.
2. Find the least and the greatest integral factor of the following :—165 ; 455 ; 286.
3. Find the prime factors of 372.
4. How many boards, each 12 ft. 3 in., placed end to end, would reach as far as 294 boards, each 16 ft. 4 in. in length ?
5. What is the least and what is the greatest measure of 744 ?
6. Find a common measure of 24 and 78.
7. If 4 boys in 6 days earn \$7.20, how many boys ought to work 7 days to earn \$18.90 ?
8. What prime factors are common to 63 and 273 ?
9. Find the G.C.M. of 168, 240, and 288.
10. If the linear foot contained 15 inches, how many square inches would there be in a square foot ?
11. Three trees 96 ft., 84 ft., and 108 ft. were cut into boards of equal length, and as long as possible. How long were the boards ?
12. What is the least number that must be added to seven hundred and three millions six thousand and forty-seven, so as to make the sum exactly divisible by seven thousand and nine ?

**II.**

1. In selling two barrels of coal oil containing 39 gal. and 42 gal. respectively, a merchant uses the largest possible measure that will completely empty each barrel. How much does the measure hold?
2. Find the greatest number that will divide 384 and 247, leaving respectively 6 and 9 as remainders.
3. A wagon box 12 feet long and 3 feet wide holds exactly 1 cubic yard of gravel. How deep is the box?
4. A storekeeper, who has two barrels of sugar weighing 180 lb. and 300 lb. respectively, wishes to put up the sugar into parcels all of the same weight. What is the weight of the largest parcel he can use, so that each barrel may give an exact number of parcels?
5. A person wishes to enclose a field 46189 feet long and 2233 feet wide with a straight rail fence 5 rails high. The rails are to be all of the same length, and the longest he can use without cutting. How many rails will he require?
6. What number, taken from seven billions nine millions three hundred and eight thousand and six, will leave a remainder exactly divisible by five times thirty thousand and ninety-seven?
7. If 7 bushels of wheat are worth 10 bu. 2 pk. of oats, how many bushels of oats are equal in value to 12 bu. 2 pk. of wheat?
8. What is the least number which, taken from 4000, leaves a remainder of which 59 is a divisor?
9. Find the greatest number that will divide 497, 791, and 1043 without leaving any remainder.
10. A wagon loaded with coal weighs 2612 pounds, and the wagon alone weighs 1112 pounds. If the dealer receives \$4.50 for the load, what is the price of coal per ton?
11. A man has 212 bushels of oats and 371 bushels of barley. He wishes to put the grain, without mixing it, into the largest possible bins of equal size. How many bins does he require?
12. A man who owns a piece of ground 152 rods long and 572 yards wide wishes to divide it into the largest possible square lots, each containing the same number of square rods. Find the length of each lot in rods.

**Least Common Multiple.**

(Including Previous Work.)

**III.**

1. Find a multiple of 7.
2. Find a common multiple of 3 and 8.
3. A merchant purchased 38 gallons of vinegar at 50 cents a gallon. After adding water, he sold it at 60 cents a gallon, and gained thereby \$4.70. How much water did he add?
4. Find the L.C.M. of 24 and 36.
5. What is the G.C.M. of 10219, 11957, 3223, and 4411?
6. What number, subtracted 42 times from 30685, will leave a remainder of 67?
7. I paid \$1.80 for apples at the rate of 10 for 9 cents, and sold them at the rate of 8 for 10 cents. How much did I gain?
8. The prime factors of a certain number are 17, 19, 3, 2, and 7. Find the number.
9. What is the least number which, divided by 3, 7, 10 or 14, leaves 2 for remainder in each case?
10. In digging a cellar 27 feet long and 24 feet wide, a man removed 144 cubic yards of earth. How deep was the cellar?
11. A boy in counting over a basket of eggs, found that whether he counted them 7 at a time or 8 at a time, he had 4 eggs left in the basket in each case. How many dozen at least did the basket contain?
12. If a certain number were 3 greater, it would be exactly divisible by 14 or 17. What is the number?

**IV.**

1. If the linear yard contained 4 feet, how many cubic feet would there be in a cubic yard?
2. If a man had \$13 more he could divide his money equally among 8 boys or 11 girls, giving each an exact number of dollars. How many dollars has he?
3. Find two multiples of 12, 14, and 16.
4. The product of two numbers exceeds 603995984 by ninety-nine millions six thousand seven hundred and sixteen; the smaller number is 7009. What is the larger?

5. What is the shortest board that can be measured with a cane 3 feet long, or with one 2 ft. 6 in. long?
6. What is the smallest chest of tea that can be put up into 5 lb. 4 oz. or 7 lb. parcels?
7. A man has 900 bushels of wheat in his barn, and his farm yields 550 bushels each year. If he sells 700 bushels each year, in what time will his barn be empty?
8. A lawn 66 ft. 7 in. long and 32 ft. 7 in. wide is to be sodded with square sods of uniform size. How many sods of the largest possible size will be required?
9. What is the least number of dollars with which a man can buy sheep at \$6 each, pigs at \$10 each, or cows at \$45 each, and have \$1 left?
10. The road between two towns is 4 rods wide, and contains 144 acres. If a man can walk the distance between the towns in 4 hours 30 minutes, at what rate per hour does he walk?
11. A and B start on bicycles from the same place at the same time, and ride around a circular course in the same direction. If A can go round it in 10 minutes, and B in 12 minutes, how many rounds will each have made before they are both at the starting place at the same time?
12. A cellar 27 feet long and 6 feet deep took 324 square feet of flooring. How many cubic yards of earth were removed in digging it?

### Vulgar Fractions.

(*Including Previous Work.*)

### V.

1. How many quarters of an apple are there in 6 apples?
2. How many quarter-pound parcels are there in  $17\frac{3}{4}$  pounds?
3. A farmer put 79 bu. 3 pk. of apples and 30 bu. 1 pk. of plums into the largest possible barrels of equal size, keeping each kind of fruit separate. How many barrels did he use?
4. A board  $12\frac{3}{5}$  feet long was cut into lengths of  $\frac{1}{5}$  of a foot each. How many pieces were there?
5. In an orchard there were 33 rows of trees; each row had 40 trees, and each tree yielded 4 bu. 1 pk. of apples; the whole crop was put into barrels, each holding 2 bu. 3 pk., and sold for \$3060. What was the price per barrel?

6. How many pints are there in 28 bottles, each containing  $\frac{1}{3}$  of a pint?

7. A farmer has a bin containing the smallest quantity of wheat that will fill an exact number of bags holding 2 bu. 2 pk. or 3 bu. 1 pk. each. What is the value of the wheat at 60 cents per bushel?

8. A boy can pick  $\frac{1}{4}$  of a bushel of cherries in one hour. How many bushels can he pick in 4 days, working 8 hours a day?

9. The dividend is sixty-four millions three hundred and nine thousand eight hundred and five, the quotient is 6708, and the remainder is 209. What is the divisor?

10. How many sixteenths of an apple are there in  $\frac{3}{8}$  of an apple?

11. Express  $\frac{2}{3}$  in twenty-fourths.

12. A grain-dealer paid \$54.40 for some oats. After selling 80 bushels at 50 cents a bushel, the remainder stood him at the rate of 30 cents a bushel. How many bushels did he buy?

## VI.

1. Reduce  $\frac{539}{616}$  and  $\frac{1172}{1763}$  to their lowest terms.

2. Which is the greatest, and which the least of  $\frac{8}{15}$ ,  $\frac{7}{26}$ ,  $\frac{13}{30}$ ?

3. If 28 tons 11 cwt. 25 lb. of hay cost \$182.80, what will be the cost of a bale weighing 200 lb.?

4. My farm is valued at \$6000, and it contains the least number of acres that can be divided into fields containing 800 sq. rd., 960 sq. rd., or 1280 sq. rd. each. What is the value of the farm per acre?

5. Express  $\frac{29}{40}$  and  $\frac{12}{32}$  in equivalent fractions having 8 for denominator.

6. Thomas ate  $\frac{2}{3}$  of an apple, James  $\frac{3}{4}$  and Henry  $\frac{4}{5}$ . How many apples did all eat?

7. Four times the sum of two numbers is 255696, and five times their difference is 49860. What are the numbers?

8. Jane bought  $\frac{5}{7}$  of a pound of raisins, and Mary bought  $\frac{3}{1}$  of a pound more than Jane. What quantity did both buy?

9. One boy can dig  $2\frac{1}{3}$  bushels of potatoes in an hour, a second boy can dig  $\frac{1}{4}$  of a bushel more than the first, and a third boy can dig as many bushels as the first and second together. How many bushels can the three boys dig in one hour?

10. Make out the following bill : 4800 rails at \$7.25 per C ; 3284 bricks at \$3.50 per C ; 2380 feet of lumber at \$16 per M ; 1248 pounds of pork at \$6.25 per cwt. ; 9365 pounds of bran at \$16 per ton.

11. One man earned \$5 $\frac{1}{2}$  in a week, a second man earned \$2 $\frac{1}{2}$  more than the first, and a third man earned as much as the first and second together. How many dollars did all earn ?

12. The cost of seed for a field 80 rods long and 330 yards wide was \$45. If 2 bu. 2 pk. were sown on an acre, what was the value of the seed per bushel ?

## VII.

1. The difference in weight between two pigs is  $1\frac{3}{5}$  ewt., and the lighter pig weighs  $2\frac{5}{6}$  ewt. What is the weight of both ?

2. A farmer bought 25 bushels of wheat at the rate of 2 bu. 2 pk. for \$1.50, and sold it at the rate of 4 bu. 1 pk. for \$3.40. What was his gain on all ?

3. A woman bought three pieces of cloth ; the first was  $2\frac{2}{3}$  yards shorter than the second, and the third was  $7\frac{1}{2}$  yards longer than the second. How many yards of cloth did she buy if the first piece contained  $4\frac{3}{4}$  yds. ?

4. A father can build a rod of fence in 20 minutes, and his son can build a rod in 30 minutes. If they work 10 hours a day, what is the length of the shortest fence that will furnish an exact number of days' labor for each working alone or for both working together ?

5. One-third the divisor is 1226, one-fourth the quotient is 676, and one-fifth the remainder is 343. Find the dividend.

6. A farm was divided into four fields. The first field contained  $18\frac{2}{3}$  acres, the second contained  $4\frac{2}{3}$  acres more than the first, the third contained  $3\frac{4}{5}$  acres more than the second, and the fourth contained as many acres as the second and third together. How many acres were in the farm ?

7. A string 10 yd. 2 ft. 6 in. long was divided into two pieces, the one piece being 1 yd. 1 ft. longer than the other. What was the length of each piece ?

8. The difference between two fractions is  $\frac{9}{40}$ , and the smaller fraction is  $\frac{3}{8}$ . Find the sum of the fractions.

9. A lot 25 rods long and 15 rods wide is surrounded by a close board fence 5 feet high. How much did the lumber cost at \$16.50 per M. ?

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10. Thomas buys papers at the rate of 7 for 3 cents, and sells them at the rate of 5 for 8 cents. If he sells 14 papers every day, what profit does he make in 5 days?

11. One-half the sum of two numbers is 330, and one-fourth their difference is 27. Find the numbers.

12. Make out the following bill in proper form:

22 bu.	12 lb.	of barley	at	56 cents per bushel
19 "	17 "	oats	"	36 "
12 "	15 "	wheat	"	84 "
9 "	28 "	corn	"	44 "
13 "	14 "	rye	"	72 "
7 "	20 "	peas	"	54 "
6 "	12 "	buckwheat	"	56 "
8 "	12 "	timothy seed	"	\$1.60
7 "	15 "	clover seed	"	\$5.60

### VIII.

1. One man has a lot of  $\frac{2}{3}$  of an acre, and another has one of  $\frac{1}{2}$  of an acre. How much is the first lot larger than the second?

2. A farmer had  $\frac{3}{5}$  of a ton of hay and bought  $\frac{1}{2}$  of a ton; he then sold  $\frac{5}{7}$  of a ton; how much had he left?

3. What will be the cost of 500 pieces of scantling, each 20 ft. long, 5 in. wide, and 3 in. thick, when lumber is worth \$18.40 per M.?

4. How much must be added to  $\frac{19}{64}$  to make  $\frac{14}{27}$ ?

5. A man who had  $11\frac{3}{4}$  acres of land sold  $6\frac{2}{3}$  acres. How much land had he left?

6. A woman bought a number of hens and chickens for \$32, paying three times as much for a hen as for a chicken. There were five times as many chickens as hens, and the hens cost her 60 cents each. How many of each did she buy?

7. Two men earned \$45 $\frac{6}{35}$  in a week. If one man earned \$16 $\frac{1}{7}$ , how much did the other earn?

8. Three men owned  $\frac{13}{5}$  of a mill; the first man owned  $\frac{2}{11}$ , and the second owned  $\frac{1}{3}$ ; how much did the third man own?

9. The product of three numbers is 2764796736; one of the numbers is 3678, and another is 278. What is the third number?

10. From a piece of cloth containing 25 yards,  $4\frac{7}{8}$  yards were sold to one woman and  $11\frac{3}{5}$  yards to another. How many yards remained unsold?

11. A boy who had a journey of 50 miles to travel went  $16\frac{4}{7}$  miles one day and  $15\frac{3}{8}$  miles the next. How far had he yet to go?

12. The wire for a fence around a rectangular plot of ground, 64 feet by 35 feet, cost \$7.70. The fence was 5 wires high, and 3 yards of wire weighed 1 pound. How much did the wire cost per cwt.?

### X.

1. Three men bought a horse for \$114 $\frac{1}{3}$ . The first man paid \$28 $\frac{1}{3}$ , and the second paid \$11 $\frac{1}{3}$  more than the first. How much did the third man pay?

2. A milkman buys 10 gal. 3 qt. of milk for \$1.72; how much water must he add so that he may sell it at 20 cents a gallon, and thereby gain 68 cents on the whole?

3. A butcher bought a sheep for \$7 $\frac{2}{3}$  and a pig for \$6 $\frac{2}{3}$ . For what must he sell both to gain \$4 $\frac{7}{11}$ ?

4. What width of plank 18 feet long and 3 inches thick will contain 36 feet of lumber?

5. \$21 $\frac{8}{9}$  is \$4 $\frac{7}{11}$  less than what my suit cost. How much did I pay for it?

6. Fifty bags, each holding 2 bu. 2 pk. 1 gal., are filled with wheat. How many bags would be required to hold the same quantity if each bag held 3 bu. 3 pk.?

7. What sum taken from \$118 $\frac{7}{10}$  will leave \$100 $\frac{7}{13}$ ?

8. The sum of two numbers is  $48\frac{1}{3}$ , and one of them is  $29\frac{1}{3}$ . What is the other?

9. If 4 men can do as much work in a day as 9 boys, how many men will do the same amount of work as 11 men and 27 boys?

10. Will had \$48 $\frac{2}{3}$  and Tom had \$27 $\frac{3}{4}$ ; Will gave Tom \$26 $\frac{3}{4}$ , and Tom gave Will \$14 $\frac{2}{3}$ . Which had the greater amount then, and how much greater?

11. The product of three numbers is 220200282, and the product of two of them is 252234. Find the third.

12. The difference between two numbers is  $5\frac{2}{6}$ , and the smaller is  $7\frac{2}{3}$ ; find their sum.

### X.

1. A man put his flock of sheep into four pens: he put  $\frac{2}{5}$  of the flock into the first pen,  $\frac{3}{8}$  of it into the second, and  $\frac{1}{5}$  of it into the third. What part of his flock did he put into the fourth pen?

2. A's lot is  $\frac{2}{5}$  of an acre larger than B's, but only  $\frac{1}{6}$  of an acre larger than C's. How much is B's smaller than C's?
3. Two persons started from the same place and travelled in opposite directions; at the end of one hour they were 7 mi. 280 rd. apart; had they travelled in the same direction for one hour, they would have been 1 mi. 40 rd. apart. How far did each travel per hour?
4. Smith's farm contains  $17\frac{3}{7}$  acres more than Jones', but  $8\frac{2}{3}$  acres less than Brown's, which contains  $106\frac{3}{4}$  acres. How many acres are in the three farms?
5. Three bins contained  $307\frac{8}{15}$  bushels of wheat. The first and second together contained  $204\frac{31}{35}$  bushels, and the second and third together contained  $209\frac{1}{28}$  bushels. How many bushels were in each bin?
6. What number multiplied by 7, the product increased by 14, the sum divided by 7, and 13 subtracted from the quotient, will leave 17?
7. Harry lives  $5\frac{1}{4}$  rods nearer to the school than Ned, and  $4\frac{1}{2}$  rods farther than Thomas, who lives  $25\frac{3}{5}$  rods from it. John lives  $7\frac{1}{3}$  rods nearer than Ned. How far does John live from school?
8. From  $\frac{5}{8} + \frac{1}{5}$  take  $\frac{3}{4} - \frac{2}{3} + \frac{1}{20}$ .
9. A road 5 miles long and 16 feet wide was built of plank 3 inches thick. What did the lumber cost at \$17.50 per M?
10. It took  $47\frac{37}{60}$  gallons of milk to fill three cans. The first and second together held  $30\frac{2}{5}$  gallons, and the second and third together held  $31\frac{3}{5}$  gallons. What was the capacity of the second can?
11. A grocer paid 30 cents per pound for butter, and sold it at 24 cents a pound. How much did he lose on every dollar he paid?
12. The sum of three fractions is  $2\frac{3}{7}$ ; the first is  $\frac{5}{7}$ , and the second is  $\frac{1}{2}$  greater than the first. What is the third?

**XI.**

1. How much must I add to the difference between  $\frac{11}{12}$  and  $\frac{1}{5}$  to give a result equal to the sum of  $\frac{7}{9}$  and  $\frac{3}{4}$ ?
2. The quotient of two numbers is 1805, and one-seventh of the less number is 1009; what is the greater?
3. A and B start from the same place and travel in the same direction. On the first day, A goes  $27\frac{3}{4}$  miles, and B  $32\frac{2}{5}$  miles; on the second day, A goes  $31\frac{1}{6}$  miles, and B  $29\frac{2}{3}$  miles. How far are they apart then?

4. How much does the sum of  $2896\frac{1}{7}$  and  $2469\frac{4}{5}$  exceed their difference?
5. A village lot 10 rods long and 30 feet wide was fenced with pickets, each 3 inches wide, placed 2 inches apart. How much did the pickets cost at \$3.75 per C?
6. What is the least fraction that must be added to the sum of  $2\frac{2}{3}$ ,  $11\frac{1}{8}$ , and  $5\frac{2}{7}$  to make the result an integer?
7. 5 planks of the same dimensions contained 300 board feet. Each plank was 15 inches wide and 3 inches thick. What was the length?
8. Four houses cost \$12763. The first cost  $\$2146\frac{1}{8}$ , the second  $\$3127\frac{4}{5}$ , and the third  $\$379\frac{3}{4}$  less than the first and second together. What did the fourth cost?
9. If 21 bu. 3 pk. of oats cost \$2.95 more than 14 bu. 1 pk. 1 gal., how much would 100 bushels cost?
10. A woman spent \$3.12 buying equal quantities of tea and sugar; for the tea she paid 45 cents per pound, and for the sugar 7 cents per pound. How much did she spend on tea?
11. A woman received 8 gal. 2 qt. 1 pt. of coal oil in exchange for 2 gal. 3 qt. 1 pt. of molasses; how many gallons, etc., of coal oil should she receive for 6 gal. 1 qt. of molasses?
12. What will be the cost of carpeting a room 21 ft. long and 16 ft. 4 in. wide, with carpet 2 ft. 4 in. wide, at 65 cents per yard?

## XII.

1. Find the value of 25 pounds of tea at  $\$7\frac{7}{11}$  per lb.
2. A boy who had  $\frac{6}{7}$  of a cake gave away  $\frac{2}{3}$  of what he had. What part of the whole cake did he give away?
3. By selling a farm at \$75 per acre, the owner gained \$1350. Had he sold it at \$50 per acre, he would have lost \$900. How many acres were in the farm?
4. A man who owned  $\frac{9}{11}$  of a farm sold  $\frac{4}{9}$  of his share. What part of the farm had he left?
5. What part of a dollar will 3 pounds of beef cost, at  $\$1\frac{2}{11}$  per lb.?
6. It cost \$22.40 to carpet a room 17 ft. 6 in. by 10 ft. 6 in., with carpet 21 in. wide. What did the carpet cost per yard?
7. A grocer sold  $27\frac{3}{4}$  pounds of sugar, gaining  $1\frac{3}{8}$  cents per lb. How much did he gain on the whole?
8. How much must be added to  $\frac{2}{7}$  of  $\frac{4}{5}$  to make the sum of  $\frac{3}{4}$  and  $\frac{1}{2}$ ?

9. Peas worth 50 cents per bushel, and oats worth 30 cents per bushel were mixed in equal quantities; 60 bushels of the mixture were exchanged for wheat and barley in equal quantities at 75 cents and 45 cents per bushel respectively. How many bushels of each kind of grain were received?

10. A boy has  $4\frac{3}{4}$  pounds of candies; what is the least quantity he must buy so as to have an exact number of pounds?

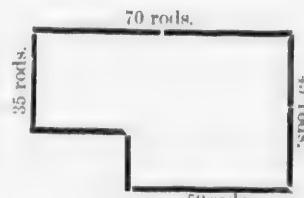
11. A man bought 31 bu. 1 pk. of barley, and sold it for \$15, gaining \$2.50 on the whole quantity. What did the barley cost him per bushel?

12. I bought  $9\frac{3}{4}$  yards of tweed at  $62\frac{1}{2}$  cents per yard, and  $24\frac{1}{4}$  yards of cotton at  $10\frac{1}{2}$  cents a yard. How much more did the tweed cost me than the cotton?

### XIII.

1. How much is 4 times  $\frac{2}{3}$  of 35?

2. The seed for a field of the accompanying shape and size cost \$34.20 when wheat was worth 60 cents per bushel. How many bushels were sown to the acre?



3. Add  $\$6\frac{5}{8}$  twenty-eight times.

4. A woman paid  $\$3.72\frac{5}{8}$  for a pound of tea and  $12\frac{2}{3}$  yards of flannel. If the flannel cost her  $24\frac{1}{2}$  cents a yard, what did she pay for the tea?

5. It required 1320 feet of lumber to build a tight board fence around a lot 24 yards long and 16 yards wide. What height was the fence?

6. One-fifth of a certain number is  $14\frac{3}{5}$ . What is the number?

7. A man sold  $7\frac{1}{4}$  bushels of wheat at  $\$2\frac{1}{2}$  per bushel and  $6\frac{2}{3}$  tons of hay at  $\$8\frac{3}{4}$  per ton. He paid a debt of  $\$50\frac{3}{4}$  out of the money he received. How many dollars had he left?

8. It costs \$19.14 to cover a room 16 ft. 6 in. square, with carpet at 58 cents per yard. What width is the carpet?

9. What number added to 4 times  $\frac{5}{6}$  of 25 will make 100?

10. If 4 tons of hay be worth 30 bushels of wheat, and 20 bushels of wheat worth 5 pigs, how many tons of hay can be bought for the price of 60 pigs?

11. From a piece of ribbon containing  $10\frac{3}{4}$  yards, a merchant sold  $2\frac{1}{2}$  yards to one person,  $3\frac{3}{4}$  yards to another, and  $2\frac{1}{2}$  yards to a third. How much is the remainder worth at  $5\frac{1}{2}$  cents a yard?
12. A cistern is 6 feet long, 4 feet wide, and 7 feet deep. How many additional cubic feet of earth must be removed to make it 7 ft. long, 6 ft. wide, and 4 feet deep?

#### XIV.

1. A person bought  $10\frac{2}{3}$  bushels of cherries, at  $\$7\frac{1}{2}$  per bushel, and had  $\$7\frac{2}{3}$  left. How many dollars had he at first?
2. If 18 pounds of sugar cost  $\$1.75\frac{1}{4}$ , how much will one pound cost?
3. A room, whose width is 16 ft. 6 in., costs  $\$38.28$  to cover it with carpet 33 inches wide, at 87 cents per yard. What length is the room?
4. A man divided  $19\frac{1}{2}$  pounds of candies among a number of boys, giving each  $1\frac{1}{3}$  lb. How many boys were there?
5. If I divide  $\$19$  equally among 8 persons, what part of a dollar will each receive?
6. A man exchanged 1500 lb. of hay at  $\$7$  a ton, and 6817 lb. of oats, at 32 cents a bushel, for 3 sheep, at  $\$6.47$  each, and 500 lb. of pork. What was the pork valued at per lb.?
7. A goes  $37\frac{2}{3}$  miles and B  $29\frac{2}{3}$  miles each day. If they travel in opposite directions for  $3\frac{1}{2}$  days, how many miles will they be apart?
8. If 6 dozen eggs weigh  $86\frac{2}{5}$  ounces, what is the weight of one egg?
9. A gardener exchanged 6 loads of tomatoes, each load containing 10 boxes of 1 bu. 2 pk. each, at 30 cents a bushel, for 10 boxes of tea, at 45 cents a pound. How many pounds of tea were in each box?
10. How many dozen eggs at  $12\frac{1}{2}$  cents a dozen will pay for  $3\frac{1}{4}$  quarts of vinegar at 20 cents a quart?
11. If 6 pigs, each weighing 250 lb., be carried 5 miles by railroad for  $\$3.25$ , what will be the cost of carrying 15 pigs, each weighing 300 lb., for 30 miles?
12. Harriet has  $\$3$ , which is  $\frac{5}{6}$  as much as Jane; how much has Jane?

**XV.**

1. Harry bought  $4\frac{1}{2}$  pounds of candies from one man and  $6\frac{1}{2}$  pounds from another. How many pounds must he yet buy so as to have 20 lb.?
2. A car 33 ft. long, 8 ft. wide, and 6 feet high is filled with 26400 lb. of baled hay; each bale is 3 ft. long, 2 ft. wide, and 1 ft. 6 in. thick, and cost 45 cents. Find the price of the hay per ton.
3. If  $\frac{2}{3}$  of a farm cost \$900, what will  $\frac{1}{2}$  of it cost?
4. Divide  $\frac{3}{4}$  of  $21\frac{1}{2}$  by  $\frac{2}{3}$  of 6.
5. If the truck-wheels of an engine be 8 ft. and the driving-wheels 21 ft. in circumference respectively, how many more times will the one revolve than the other in running from Brampton to Toronto by the G. T. Railway, the distance being 21 miles?
6. If 6 pounds of sugar cost  $\$2\frac{1}{2}$ , how much will 2 pounds cost?
7. If I pay  $\$10$  for  $\frac{2}{3}$  of a yard of cloth, what price is the cloth per yard?
8. When butter was 4 cents dearer than cheese per pound, a woman purchased 13 lb. of cheese and 11 lb. of butter for \$4.28. How much did she pay for each per lb.?
9. James ate  $\frac{3}{4}$  of a cake and John ate  $\frac{1}{2}$  of the remainder. If the whole cake cost \$3.20, how much should John pay?
10. One hundred is  $\frac{5}{8}$  of what number?
11. What will be the cost of carpeting a room 21 ft. long and 16 ft. 6 in. wide, with carpet 28 inches wide, at \$1.20 per yard, if the strips run across the room, and 6 inches per strip be allowed for waste in matching?
12. A sold  $\frac{3}{8}$  of his farm to B, and  $\frac{2}{3}$  of it to C; if C paid \$1600, what should B pay?

**XVI.**

1. How many times must  $7\frac{1}{2}$  be added to give  $136\frac{1}{2}$  for sum?
2. A man paid \$45.75 for the lumber required to enclose a square garden with a tight board fence 5 feet high. If the lumber cost \$15.25 per M, what was the length of the garden in yards?
3. A man, who was hired for 3 months at \$1.50 a day, worked  $17\frac{2}{3}$  days the first month,  $16\frac{1}{2}$  days the second, and  $11\frac{3}{4}$  days the third. How much should he get for what time he worked?
4. Mary has  $2\frac{1}{2}$  times as many plums as John, and  $\frac{2}{3}$  of her plums is 36. How many has John?

5. How many square yards of plastering are there in the walls and ceiling of a room 15 ft. 9 in. long, 12 ft. wide, and 9 ft. high, no allowance being made for windows and doors?
6. A man put  $11\frac{6}{7}$  gallons of water into a barrel of vinegar containing  $45\frac{3}{4}$  gallons, but  $4\frac{3}{5}$  gallons leaked out afterwards. What is the value of the remainder at 70 cents per gallon?
7. I bought a sheep for  $\$6\frac{5}{11}$  and a pig for  $\$1\frac{1}{7}$  less than the sheep; I sold both for \$2 more than they cost. How much did I get for them?
8. If a carpenter spends in 6 days what he earns in 4 days, how much can he save in a year of 365 days, supposing he earns \$3 in 2 days?
9. Smith owns  $\frac{5}{12}$  of a certain property, and Jones owns  $\frac{1}{7}$  more than Smith. If what both own is valued at \$16400, what is the value of the whole property?
10. Harry bought  $\frac{5}{7}$  of a yard of flannel at  $\$7\frac{7}{11}$  per yard, and  $2\frac{4}{7}$  yards of silk at  $\$8\frac{6}{7}$  per yard. How much less than \$3 did he pay for both?
11. A farm containing 351 acres was divided among 5 sons and 3 daughters; each son got 10 ac. 32 sq. rd. more than each daughter; how much land did each son and each daughter get?
12. A man who owns  $\frac{6}{7}$  of a mill sells  $\frac{2}{5}$  of his share for \$2340; how much is the remainder of what he owns worth?

## XVII.

1. What will be the total cost of the following:
- $2\frac{3}{4}$  tons of bran at  $\$12\frac{1}{2}$  per ton;  
 $4\frac{1}{3}$  cords of wood at  $\$4\frac{5}{6}$  per cord;  
 $3\frac{3}{7}$  yards of cotton at  $8\frac{3}{4}$  cents a yd.;  
 $2\frac{1}{5}$  pounds of coffee at  $27\frac{1}{2}$  cents a lb.
2. I divided a piece of land 32 rods long and 120 yards wide into lots, each 132 feet long and 90 feet wide, and sold all for \$4000. How much did I get for each lot?
3. How many pounds of sugar worth  $\$1\frac{1}{2}$  per pound must be given for  $16\frac{2}{3}$  pounds of butter worth  $\$1\frac{1}{2}$  per pound?
4. Tom, Will, and Henry bought a foot-ball for \$3.50. Will paid 25 cents more than Tom, and Henry paid as much as the other two. How much did each pay?
5. If  $\frac{2}{3}$  of a cord of wood cost \$3, how much would one cord cost? How much would a pile of cordwood 32 feet long and 6 feet high cost?

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6. A boy spent  $\frac{1}{3}$  of his money on candies,  $\frac{1}{5}$  of it on nuts, and had \$1.40 left. How much had he at first?
  7. A piece of work was to be done by 11 men in 36 days; some of the men took sick and it took the rest 44 days to do the work. How many men were sick?
  8. For  $2\frac{2}{3}$  yards of cloth and  $3\frac{1}{4}$  pounds of tea, a woman paid \$2.66. If the tea cost her 38 cents per pound, what did the cloth cost her per yard?
  9. It took 672 sods, each 2 ft. 2 in. long and 1 ft. 6 in. wide, to sod a lawn 14 yards wide. How long was the lawn?
  10. A boy lost  $\frac{2}{5}$  of his marbles on Monday,  $\frac{2}{3}$  of what remained on Tuesday, and has 12 marbles left. How many marbles had he at first?
  11. A boy is 14 years of age, and his sister is 3 years. In how many years will the boy's age be twice that of his sister?
  12. If  $7\frac{1}{3}$  cords of wood cost \$33, how much less will  $5\frac{2}{5}$  cords cost?

### XVIII.

1. How many pounds of sugar worth  $8\frac{3}{4}$  cents per pound should a storekeeper give in exchange for 30 pounds of butter worth 14 cents per lb.?
2. What fraction divided by  $\frac{3}{4}$  of  $\frac{4}{5}$  of  $2\frac{1}{2}$  will give 1 for quotient?
3. A walk 5 ft. 3 in. wide and 1 mile in length was built of two-inch plank. What did the lumber cost at \$12 per M.?
4. The G.C.M. of the numerator and denominator of a certain fraction is 97, and the fraction when reduced to its lowest terms is  $\frac{1}{3}$ ; find the fraction.
5. A boy on his road to school found  $3\frac{1}{2}$  pounds of nuts. He ate  $\frac{5}{7}$  of what he found. How much more did he eat than what he left?
6. A has lambs worth \$4 each, and B has pigs worth \$5 each; A, however, in trading with B, values his lambs at \$4.60 each; what should B value his pigs at?
7. Divide  $2\frac{3}{4} - 1\frac{1}{2}$  by  $\frac{3}{4} + \frac{2}{3}$  of  $1\frac{1}{2}$ .
8. A man performed  $\frac{2}{3}$  of a journey by rail,  $\frac{1}{5}$  of it by steamboat, and the remainder, which was 14 miles, by stage. What was the length of the journey?
9. A farmer sold 3 horses for \$500. For the first he received \$15 less than for the second, but \$10 more than for the third. How much did he get for each?

10. To what number must you add  $\frac{2}{3}$  of itself and  $\frac{2}{5}$  of itself to make 146?
11. Two tubs of butter weigh together  $51\frac{7}{4}$  lb., and one of them is  $3\frac{3}{4}$  lb. heavier than the other. What is the weight of each?
12. Find the cost of plastering the four walls of a room 17 ft. 4 in. long, 14 ft. 2 in. wide, and 10 ft. high, at 20 cents per square yard.

### XIX.

1. A person bought  $7\frac{1}{2}$  lb. of tea at  $37\frac{1}{2}$  cents per lb. and sold it so as to gain  $56\frac{1}{4}$  cents on the lot. At what price per pound did he sell it?
2. A man owns  $\frac{2}{3}$  of an acre, and  $\frac{3}{4}$  of this is  $4\frac{3}{4}$  times what his neighbor owns. How much land does his neighbor own?
3. I was charged \$1 for 2 lb. of tea and 5 lb. of sugar. If I had purchased 1 lb. of each, I would have been charged 41 cents. What was the price of each per lb.?
4.  $\frac{7}{8}$  of 16 acres is  $\frac{4}{7}$  of what land a man owns; how many acres does he own?
5. A man earns  $\$18\frac{5}{8}$  a month and spends  $\$3\frac{1}{6}$  of it. How long will it take him to save  $\$185\frac{1}{2}$ ?
6. A farmer ploughs a furrow 8 inches wide the whole length of a field in 5 minutes, and it takes him 7 hr. 30 min. to plough 2 ridges. How wide is each ridge?
7. Of what number is  $2\frac{3}{4}$  the  $\frac{7}{8}$ th part?
8. How much will it cost to plaster the walls and ceiling of a room 13 ft. 6 in. long, 10 ft. 6 in. wide, and 9 ft. high, at 30 cents per square yard, deducting  $13\frac{3}{4}$  square yards for windows and doors?
9. If I sell a lot of  $\frac{2}{3}$  of an acre for \$50, what is the value of 50 acres?
10. Three bags of wheat contain 9 bushels; the second contains 1 bu. 1 pk more than the first, but only 1 bu. more than the third. What is the value of each bag at 80 cents per bushel?
11. A owned  $\frac{2}{7}$  of a farm of 210 acres. He sold  $\frac{2}{3}$  of what he owned to B, who sold  $\frac{1}{2}$  of what he bought to C. What is the value of C's land at \$40 per acre?
12. A man who had  $\frac{7}{8}$  of a cord of wood, worth  $\$4\frac{3}{4}$  per cord, gave  $\frac{3}{7}$  of the wood for hens at  $\$1\frac{1}{2}$  each. How many hens did he get?

## XX.

1. How much is  $\frac{2}{7}$  of 3 tons 165 lb. 4 oz.?
2. A man gave 7500 lb. of hay and 13 bu. 1 pk. 1 gal. of barley for 11500 lb. of coal and \$3.53 in cash. The hay and the coal were worth \$9 and \$6 per ton respectively. What was the value of the barley per bushel?
3. A storekeeper bought pens at the rate of 5 for 4 cents, and by selling them at the rate of 6 for 5 cents he gained \$1. How many dozen did he sell?
4. Simplify  $\frac{5\frac{1}{4}}{10\frac{2}{3}-9}$ .
5. A piece of land 1 mile square was divided into 400 equal lots. How many acres were in 20 of the lots?
6. Two cisterns contained together  $334\frac{5}{6}$  gallons of water, and one contained  $96\frac{3}{4}$  gallons more than the other. How many gallons were in each?
7. How much must be added to  $\frac{2}{3}$  cwt. to make  $\frac{7}{8}$  ton?
8. What will be the cost of painting the walls and ceiling of a room 11 ft. 3 in. long, 9 ft. 4 in. wide, and 10 ft. 6 in. high, at 36 cents per square yard?
9. How many yards taken from  $1\frac{6}{11}$  rd. will leave  $\frac{3}{7}$  yd. for remainder?
10. After losing  $\frac{2}{5}$  of his capital, a merchant gained \$1100, and was then worth \$6000. How much did he lose?
11. Harry won half of John's marbles, and Ned won the other half. Before winning, Harry had 38 and Ned had 12. After winning, Harry had twice as many as Ned. How many did each boy win?
12. Find the sum of  $\frac{7}{8}$  rd.,  $\frac{2}{3}$  yd., and  $\frac{1}{4}$  in., and express your answer in yards, feet, and inches.

## XXI.

1. If  $\frac{3}{4}$  the value of a sheep is equal to  $\frac{9}{10}$  the value of a lamb, and the difference in their values is \$1, what is the value of each?
2. The lumber for a wagon box 12 ft. long, 3 ft. wide, and 1 ft. 4 inches deep cost \$1.52. What did the lumber cost per M?
3. Reduce  $\frac{3}{4} + \frac{1}{5}$  of  $(3\frac{1}{2} - \frac{1}{4} \text{ of } \frac{2}{3})$  of  $1\frac{1}{2} - \frac{1}{4}$  to its simplest form.
4. By selling cloth at 92 cents a yard, I gained  $\frac{5}{12}$  of the cost. Find my gain on two webs of  $50\frac{1}{4}$  yards each.

5. A grocer paid \$840 for a quantity of tea, and sold part of it for \$14, at 50 cents per pound, by which price he gained \$5.60 on what he sold. How many pounds did he buy?
6. Multiply 59 bu. 3 pk. 1 gal. 1 qt. by  $\frac{7}{9}$ .
7. After paying his expenses with  $\frac{2}{3}$  of his earnings, a workman saved \$6 in  $6\frac{1}{2}$  days. What wages did he get per day?
8. A boy had a journey of 15 mi. 187 rd. 5 yd. to go; he walked 3 mi. 5 rd. 1 yd. the first hour, and 2 mi. 80 rd. the second hour; his average pace of walking per hour during the rest of the journey was 2 mi. 20 rd. 3 yd. How long was he on the journey?
9. Divide 41 tons 1 cwt. 37 lb. by  $1\frac{1}{2}$ .
10. How many times can a measure which holds  $\frac{3}{4}$  of a gallon be filled from  $\frac{2}{3}$  of a barrel of coal oil containing  $47\frac{1}{2}$  gallons?
11. A butcher bought 4 cattle, weighing together 4300 lb. at 4 cents per lb.; the first weighed 50 lb. less than the second, but 100 lb. more than the third, which weighed 150 lb. less than the fourth. What did he pay for each?
12. Divide 116 mi. 290 rd. 2 yd. 1 ft. by  $12\frac{2}{3}$ .

### XXII.

1. What is the least fraction that must be taken from 62 to leave a remainder exactly divisible by  $4\frac{3}{8}$ ?
2. What is the price of pork per lb. when my butcher charges me 92 cents for 6 lb. of beef and 4 lb. of pork, the latter being 2 cents per lb. cheaper than the former?
3. A boy can hoe a row of potatoes in  $\frac{3}{8}$  of 1 hr. 7 min. 12 sec.; how much can he earn in  $\frac{2}{7}$  of 17 hr. 38 min. 24 sec., at 10 cents a row?
4. A farmer employed 11 men 36 days to drain his farm. After they had worked 16 days, he concluded to have the remainder finished in 11 days. How many additional men must he employ?
5. What quantity must be added to  $\frac{5}{8}$  of 2 tons 3 cwt. 2 lb. to make the sum of  $\frac{3}{5}$  of 2 tons 15 cwt. 85 lb. and  $\frac{7}{8}$  of 12 cwt. 64 lb.?
6. In the forenoon, a boy lost 4 out of every 7 of his marbles; in the afternoon, he lost 5 out of every 9 of the remainder, and had 20 marbles left. How many marbles had he in the morning?
7. A grocer mixed 30 lb. of tea at 50 cents a pound with some cheaper tea, and sold the mixture for \$22.50, at 45 cents a pound, gaining \$1.50 on his outlay. How much did the cheaper tea cost him per pound?

8. Reduce  $3\frac{1}{4} + \frac{1}{2}$  of  $\frac{1}{2}$  of  $(4\frac{1}{2} - 2\frac{1}{2}$  of  $1\frac{1}{2}$ ) to its simplest form.
9. Out of a tank, which is  $\frac{3}{5}$  full, a person pumps 350 gallons, and then finds that it is  $\frac{2}{5}$  full. How many gallons does the tank hold?
10. Two boxes of goods, weighing respectively 6 cwt. 17 lb. and 4 cwt. 7 lb., were shipped from Toronto to Edmonton by the C. P. Railway; the carriage of the one cost 42 cents more than that of the other. How much did the carriage cost per cwt.?
11. From the sum of  $\frac{2}{3}$  of 4 sq. rd. 1 sq. yd. and  $\frac{2}{3}$  of 8 sq. yd. 6 sq. ft. take  $\frac{1}{2}$  of 4 sq. rd. 3 sq. yd.
12. Divide \$23 among three persons, so that the first shall get \$3, and the second \$2 for every 75 cents given to the third.

### XXIII.

1. What is the smallest number that must be added to 96 to give a sum exactly divisible by  $5\frac{2}{3}$ ?
2. Allowing 4 bunches of shingles to a square, how many bunches will be required for a roof 33 ft. 4 in. long, each side being 15 ft. wide?
3. What part of 2 bu. 2 pk. is 3 gal.?
4. A woman put 96 dozen eggs into three baskets. She put 1 dozen into the first, and 7 eggs into the second for every 5 eggs put into the third. What was the value of the eggs in each basket, at 10 cents a dozen?
5. After spending  $\frac{2}{7}$  of his money, and then  $\frac{2}{3}$  of the remainder, a person had \$42 less than he spent. How much had he at first?
6. Tom and Will engaged to sell 40 papers. Tom sold 7 while Will sold 5, and at night Tom had sold 6 more papers than Will. How many papers remained unsold?
7. What fraction of 3 yd. 2 ft. is 2 ft. 1 in.?
8. If 8 men earn \$80 in 4 days of 10 hours each, how many men will earn \$288 in 6 days of 8 hours each?
9. What fraction of \$8 is  $\frac{1}{4}$  of a cent?
10. John Taylor bought the following goods from you on June 6, 1894, and paid you \$5 on account on July 25, 1894:  $4\frac{1}{4}$  lb. of coffee at 37 cents per lb.,  $5\frac{1}{3}$  lb. of rice at 4 cents per lb.,  $12\frac{1}{2}$  lb. of sugar at  $4\frac{1}{2}$  cents per lb.,  $6\frac{1}{3}$  lb. of tea at 50 cents per lb.,  $7\frac{1}{4}$  lb. of raisins at  $6\frac{2}{3}$  cents per lb.,  $8\frac{1}{2}$  lb. of currants at  $4\frac{2}{3}$  cents per lb. Make out the bill in proper form, and show to whom the balance is due.

11. A room 15 ft. 9 in. long, 9 ft. 4 in. wide, and 9 ft. 9 in. high, has a door 7 ft. 7 in. by 3 ft., a window 5 ft. by 4 ft., and a skirting-board 9 in. high; allowing for the area of the window, door, and skirting-board, what will be the cost of plastering it, at 28 cents per square yard?

12. In fishing for trout, a boy lost  $\frac{2}{3}$  of his line; he then added 11 feet and found the line was  $\frac{4}{3}$  of the original length. What was the length at first?

#### XXIV.

1. I paid \$95.92 for the following: 1944 lb. of barley at 44 cents per bushel, 2500 lb. of coal at \$6 per ton, 3500 lb. of bran at \$12 per ton, and a number of pounds of pork at \$6.40 per cwt. How many pounds of pork did I receive?

2. The owner of a lot containing 3 ac. 16 sq. rd., sold 1 ac. 4 sq. yd. What part of the lot did he sell?

3. When oats were worth 34 cents per bushel, a man fed 20 bushels to 3 horses in 4 weeks; the first horse got 7 lb., and the second 6 lb. for every 4 lb. fed to the third. What was the cost of oats for each horse per week?

4. Thomas bought marbles at the rate of 5 for 3 cents. After losing 3 out of every 5 one day, and 6 out of every 10 of the remainder the next day, he had 28 marbles left. How much money did he spend in buying the marbles?

5. A fence 6 feet high casts a shadow 4 feet, and at the same time a tree standing beside the fence casts a shadow 56 feet. What height is the tree?

6. A person exchanged  $2\frac{1}{4}$  yd. of cloth worth  $37\frac{1}{2}$  cents a yard and  $\frac{7}{8}$  lb. of tea for  $2\frac{3}{4}$  lb. of butter worth  $16\frac{1}{3}$  cents a pound and  $1\frac{1}{6}$  gal. of molasses worth 90 cents a gallon. What was the value of the tea per pound?

7. I divided 200 apples among 7 girls and 6 boys, giving to each girl twice as many as to each boy. How many did each get?

8. By selling hats at 90 cents each, a merchant clears  $\frac{1}{9}$  of the cost price; he then raises the price to 99 cents each. How much does he clear on every \$27 of outlay by the latter price?

9. At 26 cents per square yard, it cost \$14.82 to plaster the walls of a room 15 ft. long and 12 ft. wide. Find the height of the room.

10. A brick wall is 20 yd. long, 15 ft. high, and 3 ft. thick; each brick is 9 in. long,  $4\frac{1}{2}$  in. wide, and  $2\frac{1}{2}$  in. thick. No allowance being made for mortar, how much did the bricks cost at \$8 per M?

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11. Divide  $\frac{2}{3}$  of 4 mi. 20 rd. 2 yd. by  $\frac{2}{11}$  of 1 mi. 127 rd.
  12. In harrowing a field once, with a harrow 11 feet wide, a team travelled  $11\frac{1}{4}$  miles. How many acres were in the field?

**XXV.**

1. The pump in a certain well stands 5 feet above the platform,  $\frac{7}{10}$  of it is between the platform and the water, and  $\frac{1}{2}$  of it is in the water. What depth is the well?
2. If 10 horses plough 36 acres of land in 6 days, how many horses would plough one-quarter of the land in one-half the time?
3. A owned  $\frac{3}{4}$  of a factory and B the rest; D bought  $\frac{1}{3}$  of A's share and  $\frac{1}{2}$  of B's, paying \$1500 for what he purchased. What was the value of the factory?
4. How many rolls of wall-paper, 18 in. wide and 8 yards to the roll, will be required for a room 12 ft. 6 in. long, 8 ft. 6 in. wide, and 10 ft. high, deducting 4 strips for windows and doors?
5. Reduce 8 chains to the fraction of 120 rd. 6 in.
6. A man can do a certain work in 20 hours, and a boy can do it in 30 hours. In what time will they do it if they work together?
7. In 3 weeks, 65 horses, fed twice each day, consumed 5 tons 16 cwt. 2 lb. 8 oz. of oats. How many pounds and ounces were fed to each horse at one time?
8. A farmer sold  $\frac{2}{3}$  of his wheat, then  $\frac{1}{2}$  the remainder, then  $\frac{1}{8}$  of what he had at first, and had 75 bushels left for seed. Find the value of what he sold, at 60 cents per bushel.
9. A woman sold 6 chickens, 5 ducks, and 4 geese, for \$6.40. She received twice as much for each duck as for each chicken, and twice as much for each goose as for each duck. Find the price of each.
10. Express  $\frac{5}{8}$  of 2 lb. 5 oz. as a fraction of a ton.
11. A stick of square timber 32 ft. 6 in. long, 2 ft. 6 in. wide, and 1 ft. 1 $\frac{1}{2}$  in. thick weighs 4387 $\frac{1}{2}$  lb.; another stick of the same kind of timber is 21 ft. 9 in. long, 1 ft. 6 in. wide, and 1 ft. 3 in. thick; how much does the second stick weigh?
12. Divide  $\frac{7}{6}$  into three parts so that the first shall be  $\frac{1}{5}$  less than the second, and the second  $\frac{1}{5}$  less than the third.

**XXVI.**

1. Thomas Kennedy sells you 2275 lb. of hay at \$8.80 per ton, and receives from you 15 yd. of cotton at 8 $\frac{2}{3}$  cents per yard, 8 yd. of flannel at 18 $\frac{2}{3}$  cents per yard, 24 lb. of rice at 4 $\frac{1}{2}$  cents per lb., 32 lb. of sugar at 5 $\frac{5}{8}$  cents per lb., and 2 $\frac{1}{2}$  yd. of tweed at \$1 per yard. Make out the account in your own name.
2. Express  $\frac{1}{4}$  of an acre in sq. rd., sq. yd., etc.

3. A room 15 ft. 8 in. long, 11 ft. 4 in. wide, and 10 ft. high has two doors, each 7 ft. by 3 ft., and two windows, each 6 ft. by 4 ft. Estimating a bundle of lath to cover 5 sq. yd., how many bundles will be required for the walls of the room?
4. For  $2\frac{3}{5}$  cords of wood at \$4 $\frac{1}{2}$  a cord and  $2\frac{2}{3}$  bushels of oats at  $\$1\frac{1}{2}$  per bushel, a man received in exchange  $4\frac{3}{8}$  yards of cloth at  $\$2\frac{2}{7}$  per yard and  $2\frac{1}{2}$  pounds of tea. What was the value of the tea per pound?
5. James can run around a circular racecourse in 10 minutes, and John in 15 minutes. If both start from the same place at the same time, and run around it in opposite directions, in what time will they meet?
6. Five-sixths of a certain number exceeds  $\frac{3}{4}$  of the number by  $12\frac{1}{2}$ . Find the number.
7. If 8 men, working 10 hours a day, cut 48 acres of grain in 2 days, how many days would it take 3 men, working 8 hours a day, to cut 36 acres?
8. For a load of hay which was weighed on scales that gave only 1950 lb. to the ton, a man received \$7.20. How much money was the buyer cheated?
9. A lot 99 ft. long contains 16 square rods of land; the entire lot is covered with cordwood piled 4 feet in height. What is the value of the wood at \$3.20 per cord?
10. Express  $24 - 2\frac{2}{7}$  of  $1\frac{1}{3}$  of  $3\frac{4}{9} + 2\frac{1}{2} - 2\frac{1}{7} - \frac{3}{7}$  in its simplest form.
11. For a quantity of tea at 64 cents per lb., coffee at 32 cents per lb., and sugar at 8 cents per lb., a grocer received \$12.80; there were three times as many pounds of coffee as tea, and four times as many pounds of sugar as coffee. How many pounds of each did he sell?
12. A fence  $\frac{3}{7}$  of a mile long cost \$56 less than if it had been  $\frac{5}{9}$  of a mile in length. How much did the fence cost?

### XXVII.

1. How many square inches of paper would cover the surface of a cubic yard?
2. The difference in weight between two parcels of sugar is  $\frac{3}{5}$  of the weight of the lighter parcel, and both together weigh  $9\frac{3}{4}$  lb. What is the weight of each?
3. A farmer had enough hay to last 10 cows 6 weeks; at the end of 2 weeks he sold some of the cows, and the hay lasted 7 weeks. How many cows did he sell?

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4. James Brown sold to Thomas Smith the following articles to apply on an overdue account of \$50:—772 lb. of barley at 60 cents per bu., 1310 lb. of peas at 72 cents per bu., 132 lb. of pork at \$6.25 per cwt., 489 eggs at 16 cents a dozen. Make out the above account in proper form, showing to whom the balance is due.

5. A lot containing  $\frac{5}{6}$  of an acre is  $82\frac{1}{2}$  feet wide. How much will it cost to fence the lot at \$5 for 4 rods of fence?

6. A drover bought a certain number of calves, twice as many sheep as calves, three times as many lambs as sheep, paying \$612 for all. Each calf cost \$4, a sheep \$6, and a lamb \$3. How many of each did he buy?

7. An orchard contains 6 ac. 128 sq. rd. 29 sq. yd. 3 sq. ft. of land, and is 1123 ft. long. How wide is it?

8. On a certain map  $\frac{3}{4}$  of an inch represents 9 miles of country. How many square inches of the map will represent a tract of country 72 miles square?

9. A can dig a ditch in 20 days, and B in 30 days; A begins at one end, B at the other end, and they dig until they meet. What part of the ditch does each man dig?

10. From a board containing 9 board feet, a piece 4 feet in length was cut off, and the board then contained 6 board feet. What was the length and breadth of the board at first?

11. The shingles on a roof, each side of which is 32 ft. long and 18 ft. wide, lie  $\frac{1}{4}$  to the weather; each shingle is 16 in. long and 4 in. wide. Find the number of shingles.

12. By selling a certain number of papers, a newsboy gained 20 cents. He sold 3 papers for what 4 cost. How much did he receive for all the papers he sold?

## XXVIII.

1. A boy can dig a bushel of potatoes in  $\frac{1}{3}$  of an hour, and can pick a bushel in 3 minutes. In how many hours can he dig and pick 10 bu.?

2. Four sections on a railway are 6 mi. 140 rd. 2 yd. 1 ft. 6 in., 5 mi. 82 rd. 4 yd. 8 in., 6 mi. 98 rd. 1 yd. 2 ft. 5 in., and 5 mi. 318 rd. 2 yd. 1 ft. 5 in. respectively. It takes a train 12 minutes to pass over them. What is the rate of the train per hour?

3. When measured with a yard measure that is  $\frac{7}{8}$  of an inch too short, a piece of tweed appears to contain 144 yards. What is its true length?

4. Allowing the shilling to be worth  $24\frac{1}{3}$  cents, what will be the amount of the following in Canadian money: 36 tons of boiler plates at £15 14s. 6d. per ton, 10 tons of bolts at £9 12s. per ton, 100 tons of steel rails at £14 8s. 6d. per ton, 28 tons of bar iron at £12 7s. per ton?
5. What quantity added 6 times to 62 tons 1493 lb. 14 oz. will give 100 tons for result?
6. Six boys engage to hoe a field of potatoes in 6 days; after working 2 days, 4 of the boys leave. In what time will the field be hoed?
7. A man bought a basket of peaches for 95 cents;  $\frac{1}{3}$  the value of the peaches was equal to 6 times the value of the basket. What was the value of each?
8. A team travelled 10 miles in rolling a field of 10 acres. What width was the roller?
9. A can do a work in 40 minutes, B in 1 hour, and C in 2 hours. In what time will all three do it if they work together?
10. Divide 200 marbles among James, Harry, and Thomas, so that James shall get 20 less than Harry, and 4 times as many as Thomas.
11. What will it cost to fence a square field 345 links on each side, at \$1 for 1 yd. 1 ft.?
12. The difference between two fractions is  $\frac{1}{9}$  of the larger fraction, and the sum of the fractions is  $1\frac{5}{12}$ . Find the product of the fractions.

### Decimals.

(*Including Previous Work.*)

### XXIX.

1. How many tenths are in  $\frac{1}{2}$ ?
2. How many hundredths are in  $\frac{3}{4}$ ?
3. Express  $1\frac{7}{28}$  as a decimal.
4. When peas are 15 cents per bushel dearer than oats, a man receives \$19.20 for 20 bushels of peas and 16 bushels of oats. Find the price of 30 bushels of peas and 40 bushels of oats.
5. Find the sum of thirty-eight thousandths, five and twenty-seven hundredths, and one hundred and ninety-three thousandths.

FOURTH CLASS.

6. In 60 days, 35 men can dig 40 rods of a certain ditch; how many more men would be required to dig it in one-third of the time?
7. Add 6, .14, .0018, 4.109, .999, and 18.7.
8. Three men, A, B, and C, shared \$800; A received \$40 more than B, and three times as much as C. Find the share of each.
9. One man owns 82.007 acres, another 9.8 acres, a third 1.8864 acres, and a fourth 2.00896 acres. How many acres do all own?
10. Tom and Will working together can hoe a patch of potatoes in 6 hours, and Will alone can hoe it in 15 hours. In what time could Tom alone hoe it?
11. A man who owned  $\frac{2}{3}$  of a foundry sold  $\frac{1}{2}$  of his share to A, and  $\frac{1}{2}$  of what then remained to B. If B paid \$2000 more than A, what was the value of the foundry?
12. If 2 geese are worth as much as 3 ducks or 4 chickens, how many ducks are worth as much as 6 geese and 8 chickens?

**XXX.**

1. What must be added to 2.9996 to make 3.0069?
2. A piece of land contains 64 sq. rd., and is covered with cord-wood piled to the height of 8 feet. If the total value of the wood is \$4356, what is it worth per cord?
3. By how much does 55 exceed the difference between .55 and 5.5?
4. A room 19 ft. 3 in. long, 15 ft. 9 in. wide, and 10 ft. 10 in. high, with a baseboard 10 in. wide, has 3 windows, each 5 ft. 4 in. by 3 ft. 6 in., and 2 doors, each 6 ft. 10 in. by 3 ft. 6 in. How many yards of paper  $\frac{7}{12}$  of a yard wide will be required to cover the walls?
5. If  $\frac{3}{4}$  of Nelson's farm is equal to  $\frac{5}{8}$  of Taylor's, what part of Taylor's farm is equal to  $\frac{9}{25}$  of Nelson's?
6. From 412.268 take the sum of 6.0008 - .04 and 35.8 - .197.
7. One horse being equal to 2 oxen, how long would it take 24 horses to plough 32 acres, when 10 oxen can plough 8 acres in 6 days?
8. From four and two hundredths take twenty-seven thousandths.
9. Divide 99 cents among three boys, giving the first boy 1 cent less than the second, and three times as many as the third.

10. A father divided a sum of money among his three sons ; John got  $\frac{3}{8}$  of the sum, William  $\frac{3}{8}$  of the remainder, and Henry the rest, which was 10 cents more than John got. How many more cents did John get than William ?
11. A boy lost  $\frac{3}{4}$  of his marbles one day,  $\frac{1}{3}$  of them the next day, and  $\frac{2}{3}$  of them the next. What part of his marbles had he then ?
12. A can do a piece of work in 40 hours, B in 60 hours, and C in 120 hours ; A and B work at it 10 hours. In what time will C finish it ?

### XXXI.

1. What is the least quantity that must be added to the sum of 3.072, 1.9, and .27 to make the result a whole number ?
2. If 9 horses eat 13 bu. 2 pk. of oats in 8 days, in what time will 12 horses eat 15 bu. 3 pk. ?
3. Simplify  $3\frac{1}{2} + \frac{\frac{2}{3} - \frac{1}{4}}{2\frac{1}{2} + \frac{1}{2}} - \frac{7}{10}$  of  $3\frac{1}{3} - \frac{5}{6}$ .
4. From the sum of 41 hundredths and 39 thousandths take their difference.
5. What quantity subtracted 5 times from 100 miles will leave 28 mi. 295 rd. 3 yd. 1 ft. for remainder ?
6. By how much does the difference between .303 and 1 exceed the sum of .023 and .28 ?
7. In buying a quantity of tea, I was cheated 30 cents by a grocer giving me  $15\frac{5}{8}$  oz. for a pound. How much did I pay the grocer for the tea ?
8. I received \$8 for two loads of wood, each 10 ft. 8 in. long, 4 ft. wide, and 2 ft. 3 in. high. At what price per cord did I sell it ?
9. With a roller 8 ft. 3 in. in width, how many square rods of land will be rolled in going once around a field 60 rods long and 50 rods wide ?
10. The posts in a certain fence are 8 feet apart, and a man riding a bicycle passes 11 posts every 6 seconds. How many miles per hour is he going ?
11. A man hired at the rate of \$219 a year. He began work on May 11th, and quit on Sept. 18th. What wages should he receive ?
12. Jane had 39 chickens, and Mary had 15. Each girl sold the same number of chickens, and Jane had then seven times as many as Mary. How many did each sell ?

**XXXII.**

1. Add 7·0536 together twenty-five times.
2. A property is valued at \$25,000, and a person who owns a certain share of it receives \$10,00 for  $\frac{1}{5}$  of what he owns. What fraction of the property did he own?
3. Find the total weight of 248 bales of hay, each weighing .084 of a ton.
4. Three men, A, B, and C, can do a work in 4 hours; A alone can do it in 8 hours, and B in 12 hours. How long will it take C to do half the work?
5. Find the product of .0101 and .00101.
6. John, William, and Henry had 200 marbles; John had 20 more than William and twice as many as Henry. How many marbles had each?
7. A plot of ground is 38·4 yards long and 7·84 yards wide. What is the area in square yards?
8. A dealer lost  $\frac{1}{5}$  of the cost price by selling potatoes at 30 cents per bushel. Had he sold them at 40 cents per bushel, what fraction of the cost price would he have gained?
9. From the product of .89 and .98 take the product of 20 and .0002.
10. A stick of timber 24 ft. long, 10 in. wide, and 8 in. thick, weighs 720 lb., and another stick of the same kind of timber, whose breadth is 9 in. and thickness 7 in., weighs 756 lb. What is the length of the second stick?
11. What will it cost to fence a field 40·26 rods long and 39·1 rods wide at 75 cents per rod?
12. The area of Prince Edward Island is  $\frac{10}{11}$  of that of New Brunswick, and the area of Ontario is  $7\frac{1}{2}$  times the area of New Brunswick. What fraction of the area of Ontario is that of Prince Edward Island?

**XXXIII.**

1. A farm is .625 of a mile long and .25 of a mile wide. What is its value at \$80.50 per acre?
2. What depth of box 3 ft. 4 in. long and 3 ft. wide will hold  $\frac{1}{2}$  of  $2\frac{1}{2}$  cords of wood?
3. What is the value of a pile of cordwood 36·25 feet long and 5·2 feet high, at \$6.40 per cord?

4. The hay grown on a certain field will last 6 horses or 8 oxen 8 weeks. How long would it last 9 horses and 20 oxen?
5. A person who owned .736 of a store sold .028 of his share. What part of the store does he still own?
6. A man bought a load of potatoes for \$16.20. After using 14 bushels, he sold  $\frac{2}{3}$  of the remainder for \$8.80, gaining \$1.60 on what he sold. How many bushels were on the load?
7. From a web of cloth containing 100 yards, a merchant sold 7 pieces, each 1.2 yards in length. What is the value of the remainder at 25 cents per yard?
8. If I sell a pound of tea at 45 cents, I gain; if I sell it at 30 cents, I lose; the gain by the former price is 7 cents more than the loss by the latter price. Find the cost of the tea per lb.
9. The total weight of 4 bags of wheat is 10 bushels; 3 of the bags average 2.64 bushels each. Find the value of the fourth bag at 75 cents per bushel.
10. If 8 cows and 12 sheep can be kept 3 weeks for \$12, what will it cost to keep 12 cows and 9 sheep for the same time, allowing 2 cows to eat as much as 3 sheep?
11. One man can do a piece of work in  $\frac{1}{10}$  of a day, and another can do it in  $\frac{1}{15}$  of a day. If both work together, in what time will they do the work?
12. A certain building covers 1 ac. 156 sq. rd. 13 sq. yd. 4 sq. ft., and is 242 feet wide. How long is it?

#### XXXIV.

1. The total weight of 8 equal parcels is 60.504 lb. What is the weight of each?
2. A cellar wall is 2 feet thick, and the cellar inside the wall is 24 ft. long, 16 ft. wide, and 6 ft. deep. How many cubic feet of stone are in the wall?
3. How many times can you subtract .0608 from 977.664?
4. A and B can build a wall in 10 hours, B and C in 12 hours, and A and C in 15 hours. How long will it take all, working together, to do it?
5. Divide .080256 by .0209.
6. A quantity of chicory at 4 cents a pound was mixed with 30 pounds of coffee at 28 cents a pound. If  $\frac{1}{8}$  the cost was gained by selling the mixture at 27 cents a pound, how many pounds of chicory were used?

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7. Express a link in inches and the decimal of an inch.
  8. A grain-dealer purchased 200 bushels of grain, consisting of equal quantities of wheat and barley, for a certain sum of money. By selling all the grain at 80 cents per bushel he gained  $\frac{1}{3}$  of the cost price on the barley, and lost  $\frac{1}{3}$  of the cost price on the wheat. What was his total loss or gain on all?
  9. The product of two numbers is 7.668918, and one of the numbers is 9467.8. What is the other?
  10. The average width of five lots is 7 rd. 2 yd. 1 ft., and the average width of four of them is 6 rd. 3 yd. 2 ft. How wide is the fifth lot?
  11. How much would it cost to fence a field 42.08 chains long and 28.045 chains wide, at  $62\frac{1}{2}$  cents per rod?
  12. Express  $\frac{7}{4} - \frac{5}{6} + (4\frac{1}{2} \times \frac{1}{5} \div 2\frac{1}{2} \times \frac{3}{4}) + \frac{1}{2}$  in its simplest form.

### XXXV.

1. If 2.4 lb. of tea cost 91.2 cents, how much will 2.75 lb. cost?
2. What number divided by  $4\frac{1}{5} - (\frac{1}{5} \times \frac{3}{4} \text{ of } \frac{1}{2} \div \frac{1}{3}) - \frac{1}{5}$  will give  $2\frac{1}{2}$  for quotient?
3. Divide the product of 4.0004 and .0003 by .00012.
4. A farmer sold  $\frac{5}{7}$  of his land for \$2000, at \$40 per acre. What should he get for the remainder of the land at \$50 per acre?
5. The dividend is 32.4 and the divisor is .0018. What is the quotient?
6. A man can plough a field in  $4\frac{1}{2}$  days, and his son can plough it in  $5\frac{1}{2}$  days. In what time can both together plough it?
7. A wagon loaded with pork weighed 3600 lb. If .2 of the weight of the wagon was equal to .25 of the weight of the pork, and the owner received \$101.60 for his load, what was the price of pork per cwt.?
8. For a certain work 18 men, 24 women, and 27 girls received \$41.40 per day. Two men were paid as much as 3 women, and 2 women as much as 3 girls. How much did each earn per day?
9. What will be the cost of making an excavation 27.9 ft. long, 12.96 ft. wide, and 6.3 ft. deep, at 25 cents per cubic yard?
10. A can run a race of 90 yards in 10 seconds, and B in 12 seconds. How many yards' start should A give B in order to finish at the same time?

11. When  $\frac{3}{8}$  of 1.832 is taken from a certain number and  $\frac{1}{2}$  of .076 added to the remainder, the sum is 5. What is the number?
12. A certain sum of money has 6 times itself added to it, and 8 times this latter sum diminished by \$14 leaves a remainder of \$1498. Find the original sum.

### XXXVI.

1. A field containing 8.35395 acres is 40.26 rods long. How wide is it?
2. A man paid \$50.40 for cloth, and sold part of it for \$19.80, at 55 cents a yard, losing \$1.80 on what he sold. At what price per yard must he sell the remaining cloth to gain \$3 on the whole transaction?
3. What decimal of an ounce would represent  $\frac{3}{64}$  oz.?
4. I paid \$14.40 for a piece of tweed which was measured with a yard measure that was 1 inch too short. How much should I have paid?
5. Express .785 of a week in days, hours, etc.
6. On a certain map .75 of an inch represents 10 miles of country. How many square inches of the map would represent a township containing 76800 acres?
7. How many dozen peaches, bought at 3 for 2 cents and sold at 6 for 5 cents, will give a profit of \$1?
8. By selling lambs at \$2.80 each, I gain  $\frac{1}{4}$  of the cost; at what price must I sell them to gain  $\frac{3}{8}$  of the cost?
9. A can reap a field in 4 days of 10 hours each; B can reap it in 5 days of 12 hours each. In how many days of 6 hours each, would both together reap it?
10. Reduce .953125 of a bushel to pecks, gallons, etc.
11. Divide \$180 between two men, giving one  $\frac{2}{3}$  as much as the other.
12. For 4.4 quarts of molasses at 81 cents per gallon and 3 spools at 24 cents per dozen, a person received 4.24 pecks of oats at 35 cents per bushel and 18.56 ounces of tea. What was the value of the tea per lb.?

### XXXVII.

1. A ditch 1 mile long, 4 ft. 6 in. wide, and 3 ft. deep was dug for \$660. If each man employed dug 5 cubic yards per day, find his daily wages.
2. What decimal of a ton is 80 lb.?

3. When lumber was worth \$20 per thousand feet, I paid \$22 for the lumber used in building a tight board fence around a lot 20 yards long and 40 ft. wide. What height was the fence?
4. Express 3 mi. 248 rd. in miles and the decimal of a mile.
5. A father divided his farm of 270 acres among his three sons; the second son received  $\frac{1}{3}$  as many acres as the first, and the third received  $\frac{1}{2}$  as many acres as the second. What was each son's share of the farm?
6. Express 15 cwt. 51 lb. 4 oz. in cwt. and the decimal of a cwt.
7. A man spent  $\frac{1}{3}$  of his money for a cart,  $\frac{2}{3}$  of the remainder for harness, and the rest for a pony. If the pony cost him \$9 more than the cart and harness together, how much did all cost?
8. How many times will  $\frac{1}{4}$  contain .00001?
9. If 3 men can mow  $\frac{5}{6}$  of an acre in 2 hours, how many men will mow  $1\frac{2}{3}$  acres in 3 hours?
10. Express 2 rd. 2 yd. 2 ft. 3 in. as the decimal of a mile.
11. The bricks used in building a wall 27 ft. long, 6 ft. 6 in. high, and 2 ft. 6 in. thick, cost \$77.76; each brick was 8 in. long,  $4\frac{1}{2}$  in. wide, and 3 in. thick, and the mortar increased its bulk  $\frac{1}{2}$ . Find the cost of the bricks per M.
12. What is the least quantity that must be taken from the sum of 7.04,  $3\frac{2}{3}$ , 119.258,  $27\frac{5}{6}$ , and .372, so that it will contain 7.04 an exact number of times?

### Percentage.

(*Including Previous Work*).

### XXXVIII.

1. How many hundredths of a number is 7%?
2. How many pounds of hay worth \$6.25 per ton should be given in exchange for  $3\frac{2}{3}$  tons of oats worth  $36\frac{1}{4}$  cents per bushel?
3. What per cent. of a number is  $\frac{2}{5}$  of it?
4. Three men, A, B, and C, spent \$540 in a year; A spent \$20 more than twice as much as B, and C spent \$10 more than three times as much as A. How much did each spend?
5. What fractional part of a number is  $6\frac{1}{4}\%$ ?
6. How many seconds will it take a train 150 feet long, running at the rate of 20 miles an hour, to pass through a tunnel 170 yards in length?

7. What fractional part of a number is  $\frac{3}{4}\%$ ?
8. In 5 hr. 8 min. 15 sec. a man walked 15 mi. 128 rd. 22 yd. How many miles an hour did he travel?
9. How much is 5% of \$60?
10. In a race of 220 yards, A can beat B 10 yards, and C 20 yards. What distance can B beat C in a race of 140 yards?
11. What per cent. is \$3 of \$50?
12. At what times between 4 and 5 o'clock will the hands of a clock be (1) together, (2) opposite, (3) at right angles?

### XXXIX.

1. What per cent. is 3 feet of 40 feet?
2. Two parcels of tea together weigh 12·875 lb., and one of them weighs 2·625 lb. more than the other. What is the value of each parcel at 48 cents per lb.?
3. How much is 6 per cent. of 3 lb. 2 oz.?
4. Two men rented a pasture-field of 12 acres at \$4 per acre. One man put in 3 cows for 4 months, and the other 2 cows for 2 months. What portion of the rent should each pay?
5. How much is  $8\frac{1}{4}$  per cent. of 6 mi. 80 rd.?
6. If 9 men, in 10 days of 9 hours each, can do  $\frac{3}{4}$  of a piece of work, in how many days of 8 hours each, can 5 men do the whole work?
7. What per cent. is 1 hr. 20 min. of 2 hr. 5 min.?
8. A man divided his farm among his three sons; the first son got  $37\frac{1}{2}$  acres, the second got  $\frac{2}{3}$  of the farm, and the third got as many acres as the first and second together. How many acres were in the farm?
9. What per cent. of \$5 is 25 cents?
10. At what time after 6 o'clock will the minute-hand of a clock be 25 minute-spaces ahead of the hour-hand?
11. How many hundredths of  $5\frac{1}{2}$  cords of wood is  $\frac{11}{20}$  of a cord?
12. Find the G.C.M. of 16 ac. 100 sq. rd. 6 sq. yd. 2 sq. ft. and 17 ac. 142 sq. rd. 1 sq. yd. 2 sq. ft. 72 sq. in.

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**XL.**

1. I sold a house for one-half of what it cost me. What per cent. did I lose?
2. On a field of  $5\frac{1}{2}$  acres, 20 bu. 47 lb. 13 oz. of wheat were sown. What fraction of an ounce was sown on one square yard?
3. What per cent. will be gained by selling a farm for twice what it cost?
4. Divide 84 apples between two boys, giving one of them  $\frac{1}{3}$  more than the other.
5. A merchant bought 2 barrels of coal oil, containing 48 gallons each, at  $12\frac{1}{2}$  cents per gallon. If  $\frac{3}{16}$  of one barrel be lost by leakage, at what price per gallon must the remainder be sold to gain \$5.40 on the whole?
6. A merchant bought cloth at \$1.40 a yard, and sold it at a gain of 10 per cent. At what price per yard did he sell it?
7. A horse and a cow together cost \$126. The cost of the horse exceeded that of the cow by  $\frac{4}{5}$  the cost of the cow. What did each cost?
8. A man who had \$400 in the bank drew out  $4\frac{3}{4}$  per cent. of what he had in it. How much of his money remained in the bank?
9. A ditch 2 miles long, 4 feet deep, 5 feet wide at the top, and 4 feet wide at the bottom, was dug for \$1760. What did it cost per cubic yard?
10. A man sold a cow, which cost him \$40, at a loss of 8 per cent. How much did he get for the cow?
11. One man can cut a pile of wood in 6 days, and another can cut it in 8 days; they both work at it together and receive \$12 for their labor. Allowing each man wages according to his work, how should they divide the money?
12. By selling an article for \$3.29, 6 per cent. is lost. What did the article cost?

**XLI.**

1. A drover gained  $12\frac{1}{2}$  per cent. by selling a sheep for \$7.65. How much did he pay for the sheep?
2. The sum of two numbers is 115.6, and one of them is 84 times the other. Find their difference.
3. An agent sold goods to the amount of \$112. What was his commission at  $1\frac{1}{2}$  per cent.?

4. If  $\frac{2}{3}$  of John's money is equal to  $\frac{3}{4}$  of James', and  $\frac{5}{6}$  of James' equal to  $\frac{6}{7}$  of Robert's, what fraction of John's money is equal to  $\frac{2}{3}$  of Robert's?
5. My house is insured for \$6000 at  $2\frac{1}{2}$  per cent. What is the annual premium?
6. If 2 yards of cloth 30 inches wide can be made from 3 pounds of wool, how many pounds of wool will be required to make 90 feet of cloth  $1\frac{1}{2}$  yards wide?
7. A collector charged me \$15 for collecting \$250. What rate of commission did he charge?
8. From a tract of land containing 1202 ac. 110 sq. rd. 8 sq. yd. 3 sq. ft. 100 sq. in., a man sold 106 ac. 19 sq. rd. 4 sq. yd. 2 sq. ft. 102 sq. in. to one person, and three times as much to another. The remainder he divided into fields containing 17 ac. 109 sq. rd. 25 sq. yd. 8 sq. ft. 47 sq. in. each. How many fields had he?
9. I pay a premium of \$51 on a house insured for \$3400. What is the rate of insurance?
10. A person has enough oats to feed 8 horses for 10 weeks; at the end of 4 weeks he sells 2 of the horses. How long will the oats last?
11. For collecting a note at 4 per cent. commission, a man was charged \$7. What was the amount of the note?
12. By selling  $6\frac{2}{3}$  lb. of coffee at the rate of 6 lb. for \$2, a grocer gained 34 cents. What did the coffee cost per lb.?

### XLII.

1. A premium of \$15 is paid on a barn insured at 2 per cent. For what amount is it insured?
2. Make out the following bill in proper form: H. Nelson sold T. Brown, Sept. 1st, 1894, 535 lb. of flour at \$1.80 per cwt.; 48 lb. 3 pk. of peas at 64 cents per bu.; 2476 bu. 24 lb. of wheat at 84 cents per bu.; 328 lb. of barley at 50 cents per bu.; 344 lb. of potatoes at 28 cents per bu. On Sept. 4th, 1894, the account was paid in full. Write out the receipt.
3. A storekeeper who failed in business can pay only 30 per cent. of his debts. How much will a creditor lose on a debt of \$540?
4. A man do a piece of work in  $\frac{2}{3}$  of an hour, B in 1 hour, and C in  $\frac{1}{2}$  of an hour. In what time will they do it if they work together?

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5. The assessed value of my property is \$6400, and the rate of taxation is 15 mills on the dollar. What tax do I pay?

6. Ellen and Maud have 584 and 41 beads respectively. How many beads must Ellen give Maud, so that Maud may have  $\frac{1}{4}$  of what Ellen then has?

7. My agent collected my accounts and paid me \$624 after deducting  $2\frac{1}{2}$  per cent. for collecting. What amount did he collect?

8. A father divided a farm of 200 acres between his two sons;  $\frac{1}{2}$  of the elder son's share was equal to  $\frac{3}{5}$  of the share of the younger. Both sold their land at the same price per acre, the elder receiving \$2400 more than the younger. What price per acre did they receive?

9. A horse which cost \$85 is sold for \$90.10. What per cent. is gained?

10. One drover paid \$1520 for 12 horses and 16 cows, paying \$45 more for each horse than for each cow. A second drover bought 16 horses and 12 cows at the same rate as the first. How much did the second man pay?

11. If I buy tea at 50 cents per pound and sell it at 44 cents, what is my loss per cent.?

12. In freezing, water expands  $\frac{1}{10}$  in volume. How many cubic feet of water are there in a load of ice containing 36 blocks, each 22 in. long, 16 in. wide, and 15 in. thick?

### XLIII.

1. A man paid \$21 for 35 bushels of wheat. At what price per bushel must he sell it to gain 15 per cent.?

2. A sidewalk 2 yards wide and 1 mile in length was built of two-inch plank, supported by two lines of scantling, each 3 inches by 4 inches. How much did the lumber cost at \$15 per M?

3. A merchant bought 50 yards of cloth for \$80, and sold it at a loss of 10 per cent. What price per yard did he get for it?

4. A man lost .038 of his money, spent .222 of it, gave .38 of it to his son, bought a cow with .25 of the remainder, and had \$54 left. How much money had he at first?

5. A farmer pays a tax of \$90 on a property valued at \$7500. What is the rate on the dollar?

6. A can do  $\frac{1}{3}$  of a piece of work in 3 days, B can do  $\frac{1}{5}$  of the remainder in 4 days, and C can finish what then remains in  $1\frac{1}{2}$  days. How long would it take all working together to do it?

7. If, by selling a book for \$1.80, I lose 10 per cent., at what price must I sell it to gain 10 per cent.?
8. By selling a certain number of cows at \$24 each, a dealer lost  $\frac{3}{11}$  of the cost on one-half of them and gained  $\frac{5}{11}$  of the cost on the other half. If his loss on all was \$9, how many cows did he sell?
9. By selling meat at 8 cents per pound, a butcher loses 20 per cent. At what price per pound should he sell it to gain 20 per cent.?
10. A slow train going 24 miles an hour left Toronto for Stratford at 9 a.m. After a certain time, a fast train followed at the rate of 32 miles an hour, and overtook the slow train at 11.20 a.m. At what time did the second train start?
11. By selling tweed at 90 cents a yard, a merchant gains 20 per cent. What would be his gain per cent. by selling it at \$1 a yard?
12. In a game of ball, three boys made 82 runs; the first boy made 6 runs more than  $\frac{2}{3}$  as many as the second, and the third made as many as the first and second together. How many runs did each make?

#### XLIV.

1. A boy bought peaches at 4 for 6 cents and sold them at 4 for 10 cents. What was his gain per cent.?
2. A man who can paint 6 sq. yd. in an hour takes 30 hr. 33 min. 20 sec. to paint both sides of a tight board fence 10 rods long. Find the height of the fence.
3. A man spends  $\frac{1}{3}$  of his salary for board,  $\frac{1}{4}$  of it for clothing, and  $\frac{1}{6}$  of it for other expenses. What per cent. of his salary does he save?
4. What part of a wall can be built by 5 masons in  $\frac{2}{3}$  of a week when 4 masons can build  $\frac{3}{4}$  of the wall in  $\frac{2}{3}$  of a week?
5. When potatoes are bought at 10 per cent. less than 50 cents per bag, and sold at 10 per cent. more than 50 cents per bag, what per cent. is gained?
6. A storekeeper gained \$6 by selling a web of cloth at 72 cents a yard. Had he sold it at 56 cents a yard, he would have lost \$2. What did the cloth cost him per yard?
7. A blacksmith sold two ploughs at \$18 each; on the one he gained 20 per cent., and on the other he lost 20 per cent. What did he gain or lose on both? What was his gain or loss per cent. on both?

8. A, B and C can do a certain work in 8 hours; they all work 2 hours, when A leaves, and B and C finish the remainder in 10 hours. In what time could A alone do the work?

9. A man who owned 1000 bushels of wheat sold  $\frac{1}{2}$  of it one week and  $\frac{4}{15}$  of the remainder the next week. What per cent. of his wheat had he still to sell?

10. A farmer in feeding cattle uses bran, corn-meal, and oat-meal mixed in the proportion of 5, 4, and 3. What weight of the mixture will contain  $\frac{1}{4}$  of a ton of corn-meal?

11. When the rate of taxation is 8 mills on the dollar, a man pays a tax of \$43.60. At how much is his property valued?

12. When  $\frac{2}{3}$  of a bushel of wheat is worth  $\frac{3}{4}$  of a bushel of barley, and  $\frac{3}{5}$  of a bushel of barley worth  $1\frac{1}{2}$  bushels of oats, how many bushels of oats can be bought for the price of 9 bushels of wheat?

### XLV.

1. The owner of 25 per cent. of a factory sells 75 per cent. of his share for \$4200. Find the value of the factory.

2. A person paid \$126.38 for the following: 468 lb. of flour at \$4.25 per cwt., 796 lb. of pork at \$6.50 per cwt., 4780 lb. of bran at \$15 per ton, and 4500 lb. of hay. What price per ton did he pay for the hay?

3. A new school-house costing \$1500 is required in a school-section assessed for \$200000. How much will the house cost a rate-payer whose property is assessed for \$6500?

4. A carpenter cut a board 12 ft. 10 in. long into two pieces, and found that  $\frac{4}{5}$  of the longer piece was equal to  $\frac{5}{6}$  of the shorter. How far from the middle of the board did he cut it?

5. John sold his ball to Henry at a gain of 25 per cent.; Henry gained 20 per cent. by selling it to William for 30 cents. What did John pay for the ball?

6. A father and his two sons can do a certain work in 6 days. They all work at it 4 hrs., when the father leaves, and the sons finish the work in 3 days from the time the father left. What part of the work was done by the father?

7. A gallon of water weighs 10 lb., and a cubic foot weighs 62 lb. 8 oz. How many gallons must be pumped out of a rectangular cistern 6 feet long and 4 feet wide, so as to make the level of the water in the cistern sink 8 inches?

8. A man buys milk at the rate of 75 cents for  $3\frac{3}{4}$  gallons, and sells it at 10 cents for  $2\frac{1}{2}$  pints. What per cent. does he gain?
9. Divide \$170 among A, B and C, giving A \$10 more than  $\frac{2}{3}$  as much as B, and  $\frac{1}{2}$  as much as C.
10. By selling an article for \$1.92, a storekeeper gained 32 cents. What per cent. profit did he make?
11. John's age is now  $\frac{1}{6}$  of Harry's, and in 8 years it will be  $\frac{1}{2}$  of Harry's present age. How old is John?
12. What per cent. does a grocer gain by using a measure that holds 7 pints instead of a gallon?

**XLVI.**

1. A man gained 10 per cent. by selling sugar at the rate of  $12\frac{1}{2}$  lb. for \$1. What per cent. would he gain by selling 10 lb. for \$1?
2. A man bought a farm for \$9600. He gave 90 acres of it to his son, and sold  $\frac{2}{3}$  of the remainder for \$1400, gaining \$200 on what he sold. What then remained he gave to his daughter, who sold her share for \$3270. What price per acre did the daughter get?
3. What per cent. does a merchant gain by selling 10 hats for what a dozen cost?
4. At the rate of 4 yards of fence for 25 cents, it cost a farmer \$110 to fence a square field. How much was the field worth at \$60 per acre?
5. What per cent. will be gained by a grocer giving a customer 15 oz. of rice for a pound? How much will the grocer gain on an outlay of \$30?
6. A piece of work can be done by A, B and C in 1 hour, by A and C in  $1\frac{1}{2}$  hours, and by B and C in  $1\frac{5}{7}$  hours. In what time could C alone do the work?
7. I paid \$12.50 for my coat and vest. Had the coat been \$1.50 dearer, it would have cost three times the price of the vest. What did I pay for each?
8. A merchant marks goods at a profit of 25 per cent., and allows 10 per cent. discount for cash. What will be the cash price of an article which cost him \$1.20?
9. The numerators of two fractions are 13 and 15, and 4 times the sum of the fractions is  $1\frac{3}{5}$ . How much does the one fraction exceed the other?

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10. By selling oranges at a certain price per dozen, a person gained 20 per cent. Had he sold them for 3 cents more per dozen, he would have gained 50 per cent. What did the oranges cost him per dozen?

11. A man purchased a flock of sheep and lambs for \$244, paying \$6 for each sheep, and \$2.50 for each lamb; there were 5 lambs to every 3 sheep. Find the total number in the flock.

12. A grocer reduces his profit from 20 per cent. to  $12\frac{1}{2}$  per cent. by reducing the price of his tea 3 cents per pound. How much per pound did he pay for it?

### XLVII.

1. A lost 10 per cent. of his capital and was then worth as much as B, who had gained 5 per cent. on his capital. If A's capital at first was \$700, what was B's?

2. If 6 horses can plough  $1\frac{1}{3}$  acres in  $1\frac{2}{3}$  hours, in what time can 8 horses plough  $1\frac{1}{2}$  acres?

3. A merchant buys cloth at \$2 per yard, subject to successive discounts of 20 per cent. and 10 per cent. How many cents will he gain per yard by selling it at \$1.80?

4. A man who owns a lot 121 feet deep sells it at \$24 per foot of frontage. What price per acre does he receive?

5. The catalogue price of goods purchased by a merchant was \$200, subject to 25 per cent. and 20 per cent. off. The merchant sold the goods at catalogue price. What per cent. did he gain?

6. A and B together can do a piece of work in  $1\frac{5}{7}$  days, B and C can do it in  $1\frac{1}{2}$  days, and A and C can do it in  $1\frac{5}{11}$  days. How long would it take all working together to do it?

7. An agent buys a buggy, the catalogue price of which is \$100, subject to successive discounts of 20 per cent., 10 per cent., and 5 per cent. The agent sells the buggy at an advance of  $2\frac{2}{3}$  per cent. on the catalogue price. What per cent. does he gain?

8. Making a street  $\frac{5}{8}$  of a mile in length cost for labor \$1170 more than if it had been  $\frac{3}{8}$  of a mile long. If 120 men were employed 20 days in doing the work, how much did each man earn per day?

9. A man mixes 4 lb. of chicory at 6 cents a pound with 8 lb. of coffee at 24 cents a pound. At what price per pound must he sell the mixture to gain  $66\frac{2}{3}$  per cent.?

10. Divide  $8\frac{3}{4}$  lb. of candies among three boys, giving the second  $1\frac{1}{2}$  lb. more than the first, and the third  $1\frac{2}{3}$  lb. less than the second.

11. What direct discount is equivalent to successive discounts of 20 per cent. and 5 per cent.?
12. Hard coal and soft coal are respectively 1·8 and 1·25 times as heavy as an equal bulk of water. A coal-dealer fills a wagon box with soft coal, and finds that he has 1250 lb. of coal in it. How many pounds of hard coal would the same box hold?

### Simple Interest.

(*Including Previous Work.*)

### XLVIII.

1. What fraction of the principal is the interest on a sum of money for 1 year at 4 per cent.?
2. A person walking  $2\frac{2}{3}$  miles an hour starts at 8.30 A.M. from Orangeville to Brampton, and at 10 A.M. another person walking at the rate of  $3\frac{1}{3}$  miles an hour starts from Brampton to Orangeville. How far from Orangeville will they meet, the distance between the two places being 22 miles?
3. What will be the interest on \$750 for 1 year at 6 per cent.?
4. Three men engaged to do a certain work in 12 hours; after working 8 hours, they were joined by a fourth man, and the whole work was done in 10 hours. What part of the work was done by the fourth man?
5. Find the interest on \$800 for 1 year at  $5\frac{1}{2}$  per cent.?
6. In 6 weeks, 5 men, 9 women, and 14 boys earned \$446.40; each man earned as much as 3 women, and each woman as much as 2 boys. Find the wages of each per day.
7. What will be the simple interest on \$650 for 4 years at  $6\frac{1}{2}$  per cent. per annum?
8. The circumference of a wheel is  $3\frac{1}{7}$  times the diameter, and a bicycle wheel makes 2880 revolutions in running the distance between two villages, which are 4 miles apart. What is the diameter of the wheel?
9. The sum of \$640 was loaned for 3 years and 8 months at 6 per cent. simple interest. How much interest was received for it?
10. The total weight of 3 bags of oats and 4 bags of wheat is 786 lb., and the weight of 6 bags of oats and 7 bags of wheat is 1452 lb. Find the weight of a bag of each kind of grain, supposing the bags to be all of uniform size.

11. A village with a population of 2000 increased 20 per cent. every year. What was its population at the end of 3 years?
12. A grocer mixed teas worth 80 cents and 50 cents per pound respectively, putting 2 lb. of the former to 1 lb. of the latter, and sold the mixture at 75 cents per lb. His total gain on 4 chests was \$10. How many pounds were in each chest?

**XLIX.**

- Find the simple interest on \$2190 for 1 year 8 months 5 days at 7 per cent. per annum.
- Three men earned \$21 in a week. The first man earned  $\frac{2}{3}$  as much per day as the second, and the third earned  $\frac{1}{4}$  as much per day as the first and second together. Find the daily wages of each.
- A man borrowed \$160 at  $5\frac{1}{4}$  per cent., and repaid it in 73 days. What interest did he pay?
- A cubic inch of cheese was cut into cubes  $\frac{1}{8}$  of an inch on each edge. How many pieces were there?
- Find the interest on \$720 from March 4th to December 21st at 5%.
- A woman bought a quantity of sugar put up in parcels supposed to contain 14 lb. each; on weighing, she found each parcel to be 14 oz. too light. If she paid \$8 for the sugar, how much money was she cheated?
- On a property assessed at \$8000, I pay  $2\frac{1}{4}$  mills on the dollar for township purposes,  $1\frac{1}{2}$  mills for county purposes, and  $4\frac{1}{4}$  mills for school purposes. How much do I pay altogether?
- An empty tank has two pipes which can fill it in 10 and 12 hours respectively, and a third pipe which can empty it in 15 hours. In what time will the tank be full when all three are opened at the same time?
- On May 27th, 1894, a farmer borrowed \$726.25, and repaid it on October 20th, 1894, with interest at 4%. What amount did he pay?
- A can walk  $3\frac{1}{2}$  miles in 30 minutes, and B can walk  $2\frac{1}{2}$  miles in 36 minutes. What start must A give B in 6 miles, so as to finish at the same time?
- A milkman buys 20 gallons of milk at 16 cents a gallon; after adding 4 gallons of water, he sells it at 18 cents a gallon. What per cent. does he gain on his outlay?
- If 3 sheep and 5 lambs cost \$37.25, and 4 sheep and 7 lambs cost \$50.75, how many sheep can be bought for \$700?

**L.**

1. Find to the nearest cent the interest on \$675.50 from June 14th, 1894, to September 28th, 1894, at 8 per cent.
2. Two men, who were  $16\frac{1}{2}$  miles apart, started at the same time to travel towards each other. They met in 2 hr. 20 min., and found that the one had travelled  $\frac{3}{4}$  of a mile per hour faster than the other. Find the rate of each per hour.
3. I loaned a sum of money for 1 year at  $6\frac{1}{4}$  per cent., and received \$43.75 for the use of it. How much did I lend?
4. A, B, and C shared \$1650; A received \$50 more than 4 times as much as B, and C received \$30 less than  $\frac{2}{3}$  of what A and B together received. What did each get?
5. I borrowed \$21.40 at 5 per cent. simple interest on August 18th, 1893, and repaid it on October 30th, 1894. Find the amount paid.
6. By using a false measure in selling coal oil, a man receives 16 cents instead of 14 cents. How many pints does his false gallon measure hold?
7. The population of a certain town increased 10 per cent. each year for 2 years, and at the end of that time the population was 4840. What was the original population?
8. A milkman paid \$2.35 for 20 gallons of milk; he reserved 3 quarts for his own use, and sold the remainder so as to make  $7\frac{1}{2}$  cents per gallon profit on the whole quantity bought. At what price per gallon did he sell it?
9. A farmer paid \$73.80 for the use of a certain sum of money borrowed for 3 years 9 months at 8% simple interest. What was the sum borrowed?
10. How many rods of sidewalk 3 feet wide will require as many feet of lumber as a platform covering  $\frac{3}{10}$  of an acre, the thickness of the plank in each case being the same?
11. A person received \$50.40 for the use of \$280 at 6% simple interest. For what time was it lent?
12. A can do twice as much work as B in a day, and both can do a certain work in 22 days. In how many days could each alone do it?

**LI.**

1. A note for \$182.50, drawn June 24, 1892, was paid November 17, 1893, with simple interest at  $6\frac{1}{2}\%$  per annum. What was the amount paid?

2. A woman sold hens and chickens, getting 12 cents more for each hen than for each chicken. If she received as much for 6 chickens as for 4 hens, at what price did she sell each?
3. In what time will \$1200 amount to \$1464 at  $5\frac{1}{2}$  per cent. simple interest?
4. A father in 4 hours can do as much work as his son in 5 hours, and both together can dig a certain ditch in 20 hours. In what time could each alone dig it?
5. A person pays a premium of \$36 on a house insured for  $\frac{2}{3}$  of its value at  $2\frac{1}{4}$  per cent. What is the value of the house?
6. How many square feet of lead-paper will be required to line a tea-chest, the inside dimensions of which are 16 in.,  $16\frac{1}{2}$  in., and  $18\frac{1}{2}$  in.?
7. I borrowed \$100, and at the end of 9 months I repaid principal and interest with \$105.25. What rate per cent. was I charged?
8. A farmer had 418 bushels of wheat in 3 bins. The first bin contained  $\frac{3}{5}$  as much as the second, and the third contained  $\frac{3}{4}$  of the whole quantity. How many bushels were in each bin?
9. At what rate per cent. simple interest, will \$388 amount to \$476.27 in 3 years 6 months?
10. The depth of a ditch,  $133\frac{1}{3}$  rods long and  $2\frac{5}{11}$  feet wide, was increased 9 inches by 5 men in 6 days. If each man earned \$1 per day, how much was the cost per cubic yard?
11. What sum put at interest for 219 days at 4 per cent. will amount to \$936.96?
12. Three-fourths of the sum of two fractions is  $\frac{1}{6}$ , and  $\frac{3}{4}$  of their difference is  $\frac{1}{6}$ . Find the product of the fractions.

**LII.**

1. What amount will be due Oct. 1, 1892, on a note for \$140, drawn Feb. 25, 1892, with interest at  $7\frac{1}{4}$  per cent. per annum?
2. A boy bought 40 oranges and lemons for 96 cents, paying 3 cents for each orange and 2 cents for each lemon. How many of each did he buy?
3. When money is loaned at 10 per cent., in how many years will the interest received be equal to the principal?
4. An ice-house 22 ft. by 15 ft. takes 1323 blocks of ice of uniform size to fill it to the height of 12 ft. 3 in. If each block is 22 inches long and 16 inches wide, what is the thickness?

5. A man who pays an income tax of  $12\frac{1}{2}$  mills on the dollar, and spends \$2.25 $\frac{1}{2}$  daily, is able to save \$1546.92 $\frac{1}{2}$  in a year. What is his income?
6. If 10 men or 12 boys can do a certain work in 20 days, in how many days will 5 men and 9 boys do one-half the work?
7. At what rate per cent. simple interest will \$3740 double itself in  $12\frac{1}{2}$  years?
8. A man agreed to work 9 months for \$153 and 4 bags of wheat containing  $2\frac{1}{2}$  bushels each. Owing to sickness he quit at the end of 6 months, and received the wheat and \$99. What was the value of the wheat per bushel?
9. I borrowed \$160 for 1 year 4 months, and at the end of the time paid it in full by giving \$173.60. What rate per cent. simple interest did I pay?
10. A roller 11 feet long and 11 feet in circumference makes 1800 revolutions in rolling a certain field. How many revolutions would be made by a roller 9 feet long and 10 feet in circumference in rolling the same field?
11. In how many years will a sum of money amount to four times itself, reckoning simple interest at  $10\%$ ?
12. I earned \$43.75 collecting accounts at  $6\frac{1}{4}$  per cent. commission. What amount did I collect?

### LIII.

1. A man deposited \$651.25 in the Savings Bank on Aug. 28, 1893, and withdrew it with interest at 4% on April 4, 1894. Find the amount withdrawn.
2. A cubic foot of water weighs 62 lb. 8 oz., and expands 10 per cent. in freezing. Find the weight of a block of ice 22 in. long, 16 in. wide, and 15 in. thick.
3. On Feb. 15th, 1894, a farmer borrowed \$390.55 and gave his note. On June 19th, 1894, he paid the note, with interest at 6 per cent. per annum. Find to the nearest cent the amount paid.
4. A man who had a farm of 100 acres sold part of it, and afterwards bought another farm containing  $5\frac{1}{4}$  times as many acres as he sold; he then had 185 acres. How many acres were in the second farm?
5. A storekeeper sold tweed at a gain of 20 per cent. If he had sold it at 8 cents less per yard, he would have gained 4 per cent. At what price per yard did he sell it?

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6. The width of a rectangular farm is  $\frac{1}{4}$  of its length, and the distance around it is 4400 yards. What is the value of the farm at \$70 per acre?

7. A man purchases a house for \$2184, and rents it at \$18.20 per month. What rate per cent. per annum does he receive for his money?

8. When working, a laborer received \$1.30 a day and his board; when idle, his board cost him 40 cents a day. At the end of 28 days he had saved \$29.60. How many days did he work?

9. A farmer sold a cow to a drover and gained 20 per cent.; the drover lost  $12\frac{1}{2}$  per cent. by selling her for \$42. What did the cow cost the farmer?

10. A speculator bought land and sold it at a gain of  $\frac{1}{4}$  of the cost. If the amount he received for 10 acres was equal to his gain on \$3000 outlay, what did the land cost per acre?

11. A man borrowed \$840 at 5 per cent. per annum. At the end of 8 months he repaid it by giving \$840 and 40 bushels of wheat. What was the value of wheat per bushel?

12. John and James started at the same time for school, which was 1400 yards from their home. John travelled at the rate of 4 yards per second, James at the rate of 3 yards per second, and when John reached school, he turned back. How far was James from home when they met?

#### LIV.

1. A sum of money was borrowed at  $6\frac{1}{2}$  per cent. per annum. At the end of 9 months the lender received 6 $\frac{1}{4}$  cords of wood at \$4.20 per cord and 23 bushels of oats at 30 cents per bushel, as interest. What sum was borrowed?

2. A tea company in Toronto imported 1240 chests of tea at 30.5 cents per lb., and sold it at 36.75 cents per lb., gaining \$3565 on the lot. How many pounds were in each chest?

3. A man bought a house for a certain sum of money, and rented it at \$25 a month. After paying \$60 taxes and other expenses during the year, he had 6 per cent. profit on the money he paid for the house. How much did he pay for it?

4. A flower-bed 6 yards long and 12 feet wide, is surrounded by a walk 6 feet wide, the inner edge of the walk being 3 feet from the bed. Find the cost of making the walk, at 25 cents per square yard.

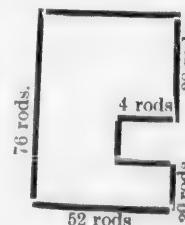
5. On Sept. 11, 1893, I bought a cow for \$40, and gave my note in payment, with interest at  $6\frac{1}{2}$  per cent. per annum. I sold the cow on April 18, 1894, for \$50, and paid my note. What was my net gain on the whole transaction?

6. When oats were worth 20 cents per bushel less than wheat, a man bought a quantity of each kind of grain, paying as much for 12 bushels of oats as for 8 bushels of wheat. What price per bushel did he pay for each?
7. If I pay \$46.86 for the use of \$852 for 11 months, what must I pay for the use of \$504 for 7 months at the same rate?
8. I have a piece of ground  $5\frac{1}{2}$  rods long and  $4\frac{1}{4}$  rods wide, surrounded by a ditch 3 ft. 4 in. wide and 3 feet deep. What was the cost of digging the ditch at 27 cents per cu. yd.?
9. The simple interest on \$300 for 2 years 2 months is \$65. What will be the simple interest on \$450 for 9 months at the same rate?
10. A bankrupt stock, which originally cost \$3000, was purchased at 60 cents on the dollar. The buyer sold it at a gain of 5 per cent. on the original cost. What per cent. did he gain by the transaction?
11. The amount of a certain sum of money loaned at interest for 6 months was \$61.50, and for 9 months it was \$62.25. What was the sum?
12. Three-tenths of Mary's plums,  $\frac{3}{4}$  of Jane's, and  $\frac{3}{7}$  of Ellen's are equal. The three girls together have 63 plums. How many has each girl?

### LV.

1. A merchant borrowed \$2460 at 5 per cent. per annum, and invested it in wheat at 60 cents per bushel. At the end of 3 months he sold the wheat at 62 cents per bushel, and paid the money borrowed. How much did he gain on the whole transaction?
2. By selling a certain number of bananas at 6 for 5 cents, a fruit-dealer gained 30 cents more than he would have gained if he had sold them at 5 for 4 cents. How many did he sell?
3. The sum of \$955 was borrowed on April 26, 1894, at 6 per cent. per annum. It was paid when the interest and principal amounted to \$989.38. On what date was it paid?

4. The seed for a field of the accompanying shape and size cost \$36.75. If 2 bu. 2 pk. were sown to the acre, what was the price of the seed per bushel?



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5. The owner of a farm sold  $\frac{5}{6}$  of it to one man for \$3800, and  $\frac{3}{6}$  of it to another at a rate  $12\frac{1}{2}$  per cent. higher; the remainder of it he sold for \$4148. How much did he receive for his farm?

6. The wheels of a bicycle are 34 in. and 30 in. in circumference respectively, and the one wheel makes 352 revolutions more than the other in running the distance between two towns. How many miles are the towns apart?

7. A merchant marks his goods at an advance of 25 per cent. on cost, and allows his customers 10 per cent. discount on the marked price. What per cent. does he gain on an article which he sells for \$1.35?

8. By selling 100 pounds of tea at 45 cents a pound I gain \$3 more than three times what I lose by selling it at 26 cents a pound. What did the tea cost per pound?

9. A person bought a number of bushels of wheat for \$1200. By selling  $\frac{3}{4}$  of it at 70 cents per bushel, he gained  $\frac{1}{6}$  of the cost price of what he sold. Had he sold all the wheat at 80 cents per bushel, how many dollars would he have gained?

10. A father and his son earned \$144 in 6 months. The son's earnings were \$9 less than  $\frac{1}{2}$  of the father's. At what rate per month was each employed?

11. A bed of gravel covering an area of 2 acres to a depth of 8 feet, was exhausted in gravelling the road between two towns. The gravel was spread 9 feet wide and 8 inches deep. Find the distance between the towns.

12. In one store a woman sold a basket of eggs, containing 10 dozen, at 10 cents per dozen; in another store she sold a second basket at 15 cents per dozen; the amount she received for all was as much as if she had sold both baskets at 13 cents per dozen. How many dozen were in the second basket?

## LVI.

1. Four chests of tea, each containing 40 lb., were purchased at 30 cents per lb. One chest was sold at a gain of 10 per cent., and the remainder at a gain of 25 per cent. What per cent. was gained on the outlay?

2. The fence-posts around a circular race-course are placed 8 feet apart. If they had been placed 6 feet apart 110 more posts would have been required. What length is the fence?

3. When  $5\frac{1}{2}$  gallons of pure milk are worth 88 cents, how much water is there in a mixture of  $5\frac{1}{2}$  gallons of milk and water worth  $12\frac{4}{11}$  cents per gallon?

4. A man bought 600 dozen eggs at 10 cents a dozen. He sold  $\frac{2}{3}$  of them at a gain of 20 per cent.,  $\frac{1}{3}$  of them at a gain of 10 per cent., and the rest at a loss of 10 per cent. What per cent. did he gain on his outlay?
5. A field containing  $4\frac{1}{2}$  acres is 24 rods wide. A second field is 18 rods wide, and requires as many rods of fence to enclose it as the first. How many acres are in the second field?
6. A person rode a bicycle from Toronto to Whitby at the rate of 10 miles an hour, and immediately returned at the rate of 8 miles an hour. It took 6 hr. 45 min. for the round trip. How far is Whitby from Toronto?
7. The owner of a farm sold it at \$50 an acre, and loaned the money at 6 per cent. per annum. Had he loaned it at 8 per cent., the interest received each year would have been \$50 more. How many acres were in the farm?
8. Mr. Brown paid \$3.80 for what butter and milk he used in 4 weeks. A pound of butter cost three times the price of a quart of milk, and he used 4 pounds of butter and 7 quarts of milk each week. What was the price of butter per lb.?
9. A man built a fence 5 boards high around a field. The bottom board was 10 inches wide, each of the next three boards 8 inches, and the top board 6 inches. The field was 30 rods long, and contained 5.25 acres. How much did the lumber cost at \$15 per M?
10. A grocer sold  $\frac{2}{3}$  of a chest of tea on Monday,  $\frac{2}{5}$  of the remainder on Tuesday, and  $\frac{2}{3}$  of what then remained on Wednesday; he received \$1.50 for what he had left, at 50 cents per lb. How many lbs. were in the chest?
11. The earth taken out of a cellar 27 feet long, 22 feet wide, and 2 yards deep, was spread over a piece of ground 4 rods long and 36 yards wide. To what depth did it cover it?
12. The *Mail* newspaper, if spread out, would cover a space of 48 inches by 34 inches, and the average daily issue is about 19800 copies; the road between Brampton and Orangeville is 4 rods wide, and 33 days' issue of the paper would be required to cover it. How many miles and rods is it from Brampton to Orangeville?

# ONTARIO EDUCATION DEPARTMENT

## EXAMINATION PAPERS.

### ADMISSION TO HIGH SCHOOLS.

June, 1883.

1. What is the object of Division? Write down the relation connecting the Divisor, Dividend, Quotient and Remainder.

Divide 108,419,716,001 by 18,748,005.

2. Find, by casting out the nines, whether the following is correct :  $349,751 \times 28,637 = 10,015,819,397$ .

Find the weight of 500,000 bricks at 4 lb. 2 oz. each, and the cost in dollars and cents, at 27s. 6d. per 1,000, allowing 4s. 2d. to make a dollar.

3. A merchant received from England the following invoice in sterling :

375 tons iron plates at £8 15s. 6d.  
 107½ tons bar iron, at £11 14s.  
 10 tons bulb iron, at £10 10s.  
 48 tons steel, at £18 7s. 6d.  
 15 tons rivets, at £11 1s.  
 17 tons T iron, at £15 10s.

Find the amount of this invoice in Canadian currency, allowing the shilling sterling to be equal to 24½ cents.

4. At \$1.75 a rod, what will it cost to fence a piece of land 63·5 rods long and 27·75 rods wide?

5. Simplify:  $1 - \frac{1}{6} + \frac{1}{24} - \frac{6}{5040} + \frac{277}{72576}$ ; and  $\frac{4\frac{7}{10} + 5.81 - 2.5}{4\frac{7}{10}}$  of 32 of .45.

6. Gunpowder is composed of nitre, charcoal and sulphur, in the proportion of 15, 3 and 2. A certain quantity of gunpowder is known to contain 20 hundredweight of charcoal; find its weight, and also the weight of nitre and of sulphur it contains.

7. Bought 360 gallons of wine at \$2.60 a gallon : paid for carriage, \$17.20, and for duties \$86.50. If  $\frac{3}{20}$  of it be lost by leakage, at what price must the remainder be sold to gain \$50 on the whole transaction ?
8. Find the interest on a note for \$257.81, dated January 3, 1883, and paid April 6, 1883, at 8 per cent. per annum.
9. The length of a second's pendulum is 39.37079 inches ; if 64 French metres are equal to 70 yards, by what decimal of an inch will the length of a second's pendulum differ from one metre ?
10. At what time between 4 and 5 o'clock are the hands of a clock (1) coincident, (2) at right angles ?

*December, 1883.*

1. Multiply the sum of 59,404 and 47,675 by their difference and divide the product by  $7 \times 13 \times 19$ .
2. Bought oranges at the rate of 10 cents a dozen, and sold them at the rate of 5 oranges for 11 cents. How much did I gain on 11 boxes, each containing 20 dozen ?
3. A man bought a rectangular field, 40 rods long by 25 rods wide, paying therefor at the rate of \$300 per acre, and then had it fenced at the rate of \$1.50 per rod. Prove that the land cost him exactly ten times as much as the fence.
4. Divide \$1,200 among A, B and C, so that A may have \$70 more than B and twice as much as C.
5. Divide the sum of  $\frac{2}{5}$  of  $8\frac{1}{3}$  and  $2\frac{1}{7}$  of  $5\frac{5}{6}$  by the difference between  $\frac{2}{7}$  of  $3\frac{1}{2}$  and  $\frac{1}{2}$  of  $2\frac{2}{3}$ .
6. Add together 1.302, 3.2589 and 40.93. Multiply the sum by .00297 and divide the product by 90.09. (Decimals, not vulgar fractions, to be used in doing the work, otherwise no marks to be allowed.)
7. A farmer sold a load of hay at \$16.25 per ton ; the whole weight of the wagon and hay was 2,875 pounds ; the wagon alone was found to weigh 1,083 pounds. How much did the farmer receive for his hay ?
8. A can run a mile race in 5 minutes, B in 6 minutes. How many yards start should A allow B in order to make their chances equal ?
9. Three men can dig a certain drain in 8 days. They work at it for 5 days, when one of them falls ill, and the other two finish the work in 5 days more. How much of the work did the first man do before he fell ill ?

10. Find the interest on \$275.80 for 91 days at 7 per cent. per annum.

*June, 1884.*

1. The quotient is 12,434, the remainder 2743, and the dividend eighty-seven millions nine hundred and eleven thousand one hundred and twenty-three. Find the divisor.

2. Find the L. C. M. of 11, 7, 21, 28, 22, 27, 81, 243, 216, and the G. C. M. of 94,605 and 96,509.

3. A sidereal day is 23 hours 56 minutes, and the mean solar day is 24 hours. Reduce the difference between the two to the decimal of a sidereal day.

4. Simplify :

$$(1). \frac{\left(3\frac{2}{5} - 1\frac{2}{11}\right) \text{ of } 6\frac{5}{12}}{1\frac{7}{16} - 1\frac{1}{11} \text{ of } 12\frac{5}{6}} \div \left(6\frac{1}{3} - 1\frac{1}{7}\right).$$

$$(2). \frac{\frac{3}{16} \text{ of a guinea} - \frac{2}{15} \text{ of a £.}}{8s. 10\frac{3}{4}d.}$$

5. A grain dealer bought 64 bags of oats, weighing (including bags) 3,616 pounds. The bags averaged 1 pound 12 ounces each. The dealer paid 34 cents a bushel for the oats and sold them at 42½ cents a bushel. How much was his gain?

6. A plate of metal  $\frac{1}{2}$  inch thick was burnished on one side for 11s. 6½d., at 2½d. per sq. inch. Find the weight of the plate, supposing a cubic foot of the metal to weigh 62½ pounds.

7. A, B and C do a work in 12 hours ; A and B can do it in 16 hours, and A and C in 18 hours. In what time can each do it separately ?

8. An army, in its first engagement, lost 1 in 10 in killed and wounded, and in its second engagement 3 in 25 of the remainder ; there were then 3,960 men left. How many men were there in the first engagement ?

9. Find the duty on 8 hogsheads of sugar, each weighing 1,200 pounds gross, at 1½ cents per pound, 16 per cent. being allowed for tare.

10. (1) Find the interest on \$225.40 for 16 months at 8 per cent. per annum.

(2) The amount of a certain principal was \$307.20 for  $3\frac{1}{2}$  years, and \$312 for  $3\frac{3}{4}$  years. Find the principal and the rate.

December, 1884.

1. Of what number is 8,967 both divisor and quotient?
2. Find the greatest number that will divide 11,067 and 35,602; leaving as remainders respectively 17 and 21.
3. Find the amount of the following bill:—12½ yards cassimere at \$2.75 per yard; 18½ yards silk at \$1.17; 23½ yards flannel at 37½ cents; 112 yards print at 9½ cents; 55 yards shirting at 17½ cents; 37½ yards tweed at \$1.12.
4. Simplify:
  - (a)  $5\frac{1}{2} + 2\frac{1}{2} \div 11\frac{3}{4} \times 7\frac{1}{2} + \frac{\$18.64}{\$1.16\frac{1}{2}}$
  - (b)  $\frac{1}{4} \times \frac{9}{11} \times 0.02 \times 0.456 \div \frac{16}{17} \text{ of } \frac{3}{5}$ .
5. The cost of carpeting a room 15 feet long, with carpet 27 inches wide, costing 90 cents a yard, is \$22.50. What is the width of the room?
6. A boy can do a piece of work in  $4\frac{2}{3}$  days, and a man can do the same in  $\frac{3}{7}$  of the time. How many days will both working together require to do five times the amount of work?
7. How much water must be added to 92 gallons of brandy worth \$4.60 a gallon, in order that the mixture may be worth only \$3.60 a gallon?
8. Find the simple interest on \$275.60 from 18th July, 1883, till 13th September, 1884, at 6 per cent. per annum.
9. At what time are the hands of a clock exactly 2 minute spaces apart between 4 and 5 o'clock?

June, 1885.

1. Express in words:—17089653.005904, \$705.637 and MDCCCLXXXV.
2. Simplify:— $\frac{7}{47}(3\frac{1}{2} + 9\frac{3}{4}) \div \frac{4}{13} \text{ of } \frac{\text{£}15. 10s. 2d.}{16s. 2d.}$
3. Find the value of  $17.654 + 4.835 + 6.408$ .
4. Make out a bill of the following goods:—23 yards cotton at 11 cents; 13 yards gingham at 23 cents; 25 yards flannel at 37 cents; 18½ yards tweed at \$1.50; 12½ yards serge at \$1.75; 6½ yards broad-cloth at \$4.50.
5. A merchant purchases sugar at \$7.50 per hundredweight; at what price per pound must he sell it in order to gain 10 per cent.?

6. Find the simple interest on \$167 for 3 years, 9 months, at 7 per cent. per annum.
7. In what time will any sum of money double itself, at 6 per cent. simple interest?
8. \$1,200 is to be divided between two persons, A and B, so that A's share is to B's share, as 2 to 7. Find the share of each.
9. At what two times between 3 and 4 o'clock are the hands of a watch equally distant from the figure III?
10. A man having \$720 spends a part of it, and afterwards received  $7\frac{1}{2}$  times as much as he spent; he then had \$1305. How much did he spend?

*December, 1885.*

1. Define the following terms: - Factor, Prime number, Multiplication. Write down all the prime factors of 2,310.
2. (a) Reduce to simplest form: —  $\frac{9534}{15863}$ .  
 (b) What is the least number from which 1,224 and 1,656 may each be taken an exact number of times?
3. A man who lost  $\frac{1}{5}$  of his fortune in one year, and  $\frac{2}{7}$  of the remainder the next year, had \$900 left. Find the amount of his fortune at first.
4. What quantity taken from  $159\frac{1}{2}$  will make it exactly divisible by  $12\frac{5}{6}$ ?
5. Express 374976 minutes as the decimal of a week.
6. What will 11,750 feet of lumber cost at \$27.50 per thousand?
7. Name the units of length, time, and sterling money.
8. Find the simple interest on \$800 for 3 years at  $5\frac{1}{2}$  per cent.
9. A cistern has three pipes; the first will fill it in 10 hours, the second in 12 hours, and the third in 15 hours. In what time will they together fill the cistern?

*July, 1886.*

1. (a) Multiply the sum of forty-eight thousand six hundred and thirty-nine, and thirty-nine thousand five hundred and thirty-seven by their difference and divide the product by sixty-four.  
 (b) The product of four numbers is 827, 658, 432; the first number is 12, the product of the second and third is 144. Find the fourth.

2. Make out a bill of the following articles : -

$28\frac{1}{2}$  yards flannel, at 68 cents ;  
 35 yards calico, at 15 cents ;  
 $3\frac{1}{2}$  dozen pairs of stockings, at \$2.10 ;  
 7 pairs gloves, at 90 cents ;  
 $12\frac{1}{2}$  yards linen, at \$1.12 ;  
 4 pairs of muslin curtains, at \$4.20.

3. What will it cost to fence a lot 49 feet front and 180 feet depth at \$1.15 a foot ?

4. (a) A horse worth \$170 and 3 cows worth \$36 each were exchanged for 14 calves and \$82. Find the value of a calf.

- (b) A farmer sold an equal number of horses, cows and calves, receiving \$3,540 for the whole. Valuing a horse at \$69, a cow at \$37 and a calf at \$12, find the number of each.

5. (a) What sum of money will produce \$300 interest in  $2\frac{1}{2}$  years at 6 per cent. simple interest ?

- (b) At what rate per cent., simple interest, will a sum of money amount to 3 times itself in 25 years ?

6. Divide \$1,000 among A, B and C, so that A may have \$60 more than B, and twice as much as C.

7. Five men can do a certain piece of work in 20 days ; after working 15 days they are joined by another man, and the whole work is completed in 19 days. What fraction of the work is done by the sixth man ?

8. In a 440-yard bicycle race A can give to B 20 yards start, and to C 30 yards. B and C ride a 440-yard race, starting even. By how much does B win ?

*December, 1886.*

1. Simplify  $\frac{1}{2} - \frac{2}{3}$  of  $\frac{5}{8} + \frac{7}{8}$  and find how many times the result is contained in  $\frac{3}{8} \div (\frac{1}{6} \text{ of } \frac{3}{14} - \frac{1}{8})$ .

2. Divide the product of .037 and .0025 by the sum of .9, .02 and .005.

3. If a road is 4 rods wide, how many miles of it will make 10 acres ?

4. A lot 150 feet long and 100 feet wide is to be surrounded by a close board fence 6 feet high. What will the boards cost at \$12.50 per thousand feet ?

5. A farmer bought a number of horses and cows for \$2,000. There were three times as many cows as horses, and a horse cost twice as much as a cow. If each horse cost \$80, how many cows did he buy ?

6. A man has a salary of \$400 a year and has \$500 in the bank. If he spends \$500 a year, in what time will his money be all gone?
7. What will a dollar amount to in 3 years 219 days at  $7\frac{1}{2}$  per cent. per annum?
8. A man borrows \$900, for the use of which he has to pay \$3 a month. How long will he have had it, when the interest is 50 cents on every dollar borrowed?
9. A dealer sold an article for \$8.10 and lost 10 per cent.; at what selling price would he have gained 10 per cent.?
10. How can you tell, without actual division, whether a number can be divided by 9 without leaving a remainder?
11. If a cow gives 12 quarts 1 pint of milk every day, and 1 pound 8 ounces of butter can be made from 25 quarts of milk, how many pounds of butter can be made in one week from the milk of 16 cows?
12. A man bought a quantity of tea supposed to be done up in packages of 1 pound each, for which he was to pay \$64; on weighing them, however, it was found that each package was 1 ounce too light. How much should he pay for the tea?

*Entered 1887.*

1. What multiple of 595 divided by 595 gives as quotient 595?
2. Find the least common multiple of \$2, \$3, \$4, \$5, \$10, \$20, \$50 and \$100.
3. A man owns  $\frac{3}{5}$  of  $\frac{5}{6}$  of  $\frac{7}{10}$  of an investment; on selling  $\frac{2}{7}$  of his share he finds himself worth \$100 less than before. What is the value of the whole investment?

4. Change  $\frac{1}{\frac{1}{3} + \frac{\frac{1}{3}}{3 + \frac{1}{4}}}$  to a simple fraction.

5. What principal will amount to \$840 in 5 years at  $4\frac{1}{2}$  per cent.?
6. If 1 pound of thread makes 3 yards of linen  $1\frac{1}{4}$  yards wide, how many pounds would make 45 yards of linen 1 yard wide?
7. A man sold two farms for \$3,000 each; on one he gained 20 per cent. and on the other he lost 20 per cent. Did he gain or lose on the whole, and how much?
8. If a garrison of 1,000 men have provisions for 12 months, how long will the provisions last if at the end of 2 months they be reinforced by 500 men?
9. A merchant sold a piece of cloth for \$24 and thereby lost 25 per cent. What per cent. would have been the gain had he sold it for \$34?

*December, 1887.*

1. Ten cents will buy 3 oranges, 4 lemons or 5 apples. How many apples are worth as much as 5 dozen oranges and 7 dozen lemons?
2. A man can run 100 yards in 10 seconds. How many miles will a steamboat go in  $5\frac{1}{2}$  days at the same rate?
3. Find the interest on \$150 from the 16th of July to the 9th of December, at 5 per cent. per annum.
4. A person borrows money for 6 years at  $3\frac{1}{2}$  per cent., and repays at the end of the time as principal and interest, \$847. How much did he borrow?
5. A map is drawn to the scale of  $\frac{1}{2}$  an inch to a mile. How many acres are represented by a square inch on the map?
6. One workman charges \$3.00 for a day's work of 8 hours, and another \$3.50 for a day's work of 9 hours. Which had I better employ, and how much shall I have to pay him for work that he can do in a fortnight, working 6 hours a day?
7. Water in freezing expands 10 per cent. If a cubic foot of water weighs 1,000 ounces, find the weight of a cubic foot of ice.
8. A merchant bought 1,000 yards of carpet at 60 cents a yard, and sold  $\frac{2}{3}$  of it at a profit of 30 per cent., one-half at a profit of 20 per cent. and the rest at a loss of 20 per cent. How much did he receive for the carpet?
9. A piece of land is surrounded by a stone wall 8 feet high and 2 feet thick; the land inside the wall is 100 feet long and 50 feet wide; how many cubic feet of stone does the wall contain?
10. A house and lot are together worth \$2,100;  $\frac{1}{4}$  of the value of the house is equal to  $\frac{1}{3}$  of the value of the lot; find the value of each.
11. A cubical cistern is 5 feet deep, how many gallons of water will it hold if 277.274 cubic inches make a gallon?

*July, 1888.*

1. Prove the rules for division (1) of vulgar fractions, (2) of decimals, using as examples  $\frac{3}{4} \div \frac{5}{7}$  and  $.012 \div .6$ .
2. A produce merchant exchanged 48 $\frac{2}{3}$  bushels of oats at 39 $\frac{2}{3}$  cents per bushel, and 13 $\frac{1}{2}$  barrels of apples at \$3.85 a barrel for butter at 37 $\frac{1}{2}$  cents a pound. How many pounds of butter did he receive?

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3. A train going 25 miles an hour starts at 1 o'clock p.m. on a trip of 280 miles; another going 37 miles an hour starts for the same place at 12 minutes past four o'clock p.m.; when and where will the former be overtaken?

4. If in a certain town \$3,093.75 was raised from a  $\frac{3}{4}$  per cent. tax, what was the value of the property in the town?

5. By selling my cloth at \$1.26 a yard I gain 11 cents more than I lose by selling it at \$1.05 a yard. What would I gain by selling 800 yards at \$1.40 a yard?

6. How many thousand shingles 18 inches long and 4 inches wide, lying  $\frac{1}{2}$  to the weather, are required to shingle the roof of a building 54 feet long, with rafters 22 feet long, the first row of shingles being double?

7. A farmer employs a number of men and 8 boys; he pays the boys \$0.65 and the men \$1.10 per day. The amount that he paid to all was as much as if each had received \$0.92 per day; how many men were employed?

8. A field whose length is to its width as 4 to 3, contains 2 acres, 2 roods, 32 rods; what are its dimensions?

9. A man having lost 20 per cent. of his capital is worth exactly as much as another who has just gained 15 per cent. on his capital; the second man's capital was originally \$9,000. What was the first man's capital?

*December, 1888.*

1. Write down neatly the following statement of six weeks' cash receipts; add the amount vertically and horizontally, and prove the correctness of the work by adding your results:

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	TOTAL.
1st	\$29.87	\$31.47	\$33.35	\$35.00	\$26.16	\$48.17	.....
2nd	27.38	30.05	28.39	34.83	27.67	49.99	.....
3rd	19.96	29.70	29.98	36.10	25.49	47.30	.....
4th	23.19	32.73	31.80	37.91	27.84	50.00	.....
5th	17.84	31.19	27.36	35.55	28.10	53.94	.....
6th	12.09	26.07	24.09	31.87	29.15	57.77	.....
Totals.	.....	.....	.....	.....	.....	.....	.....

2. If you buy 3 pounds of butter at 28 cents a pound, 5 pounds of tea at 56 cents a pound, 6 bars of soap at 17 cents a bar, 12 gallons of oil at 27 cents a gallon, and 3 oranges at 40 cents a dozen, and the merchant throws off 10 cents for each dollar's worth purchased; how much change would you get out of a \$10 bill?

3. Divide \$82.60 among 27 men and 37 boys, so that each man may have three times as much as each boy.
4. Find the interest on \$387.56 from March 18th to November 19th at 6 per cent. per annum.
5. A bushel of potatoes weighs 60 pounds. If a grocer buys a ton of potatoes for \$15 and sells them for 15 cents a peck, how much per cent. will he gain?
6. A barn 80 feet long and 60 feet wide is built on a plot of ground 308 feet long and 204 feet wide. The rest of the plot is covered with cordwood to a depth of 8 feet. How many cords of wood are there?
7. The interest on \$870 for 4 years, 6 months is \$274.05. How much will \$1,000 amount to in 3 months at the same rate?
8. A lot 11 rods long and 9 rods wide has a fence built round it. Outside the lot, at a distance of 2 feet from the fence, a sidewalk 4 feet wide is built; how many square yards of ground does the sidewalk cover?

*July, 1889.*

1. A bushel of wheat weighs 60 pounds and a barrel of flour weighs 196 pounds. If 3 pounds of wheat make 2 pounds of flour, how many barrels of flour can be made from 343 bushels of wheat?
2. Find the interest on \$597.50 for 2 years, 5 months, 12 days at 8 per cent. per annum.
3. A and B start together and walk in the same direction, A at the rate of 4 miles an hour, and B at the rate of 3 miles an hour. At the end of 7 hours A turns and goes back. How many miles will B have gone when he meets A?
4. The circumference of a wheel is  $\frac{2}{7}$  of its diameter; find the diameter of a wagon wheel which makes 360 revolutions in going a mile.
5. A town, whose population was 10,000, increased 10 per cent. every year for three years; what was its population at the end of that period?
6. The map of Ontario recently issued by the Crown Lands Department is drawn on a scale of 8 miles to an inch. On this map the township of Scott measures  $1\frac{5}{16}$  inches in length and  $1\frac{1}{8}$  in width; how many acres does it contain?
7. If for \$7 I can have the use of \$35 for 3 years, 4 months, how much a month shall I have to pay for the use of \$8,750?

8. It is required to build a sidewalk a quarter of a mile in length, 8 feet wide and 2 inches thick, supported by 3 continuous lines of scantling 4 inches square ; what will the lumber cost at \$17 per thousand feet ?

9. Write down neatly the following statement of six weeks' cash receipts ; add the amounts vertically and horizontally, and prove the correctness of the work by adding your results :—

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	TOTAL.
1st	\$28.79	\$34.71	\$35.33	\$30.10	\$27.97	\$47.81	.....
2nd	23.87	30.03	29.38	33.84	26.77	48.77	.....
3rd	16.99	27.09	28.77	30.16	24.95	43.07	.....
4th	29.13	33.72	30.81	39.17	28.47	50.05	.....
5th	18.47	32.29	26.73	34.45	28.88	54.39	.....
6th	19.02	27.06	29.04	29.89	29.51	61.93	.....
Totals.	.....	.....	.....	.....	.....	.....	.....

December, 1889.

1. A fruit merchant bought a quantity of apples for \$144 ; he sold half of them for \$82.80, thereby gaining 12 cents a bushel on what he sold. What did the apples cost him per bushel ?

2. Find the interest on \$84.25 from April 16, 1888, to November 4, 1889, at 7 per cent. per annum, (year = 365 days).

3. A pint contains 9,000 grains of barley and each grain is  $\frac{1}{3}$  of an inch long. How far would the grains in 17 bushels 3 pecks 1 gallon 1 quart 1 pint reach if placed one after another ?

4. An orchard is  $24\frac{2}{3}$  rods long, and  $15\frac{1}{4}$  rods wide. At  $1\frac{1}{2}$  cents per cubic foot what will it cost to dig a ditch around it 3 feet 9 inches wide and 4 feet deep ?

5. A sold a town lot to B and gained  $12\frac{1}{2}$  per cent. B sold it to C for \$306 and lost 15 per cent. How much did the lot cost A ?

6. In a room 26 feet 6 inches long, 16 feet 8 inches wide, and 12 feet 3 inches high, there are three windows, each  $5\frac{1}{2}$  feet high and 3 feet wide, and 2 doors, each 7 feet high and  $3\frac{1}{2}$  feet wide. The baseboard is 9 inches wide. How much paper,  $\frac{5}{8}$  of a yard wide, will be required to cover the walls and ceiling ?

7. A farmer sells to a merchant 3,015 pounds of hay at \$16 a ton, and takes in payment 6 pounds of tea at 80 cents a pound ; 22½ pounds of coffee at 26 cents a pound ; 33 pounds of sugar at 12 pounds for a dollar ; 32½ pounds of raisins at 18½ cents per pound ; 14 pounds 13 ounces of bacon at 16 cents a pound ; and the balance in cash. How much cash does the farmer receive ?

8. Brown purchased  $\frac{7}{10}$  of a mill property for \$4,064.55, and Smith purchased  $\frac{9}{35}$  of the same property at a rate 5 per cent. higher. What did Smith's part cost him, and what fraction of the property remains unsold?

9. My farm contains exactly 184 acres 76 square rods 24½ square yards. There are 3·85 acres in garden and orchard; 9·147 acres of green crop; 76·9 acres of grain; 23·608 acres of meadow; 34 acres of pasture; and the remainder is uncleared bush. What per cent. of my farm is uncleared?

10. Write down the following statement of six weeks' cash receipts; add the amounts vertically and horizontally, and prove the correctness of the work by adding your results:—

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	TOTAL.
1st	\$95.65	\$89.24	\$59.79	\$78.04	\$59.37	\$98.16	.....
2nd	71.58	65.41	67.24	62.49	67.02	51.42	.....
3rd	58.47	57.99	50.60	71.08	82.91	76.89	.....
4th	69.29	80.07	91.87	93.74	63.36	90.21	.....
5th	45.81	93.56	82.54	57.96	72.12	67.96	.....
6th	63.42	77.68	79.18	86.60	87.31	82.75	.....
Totals.	.....	.....	.....	.....	.....	.....	.....

July, 1890.

1. Write down the following statement of six weeks' cash receipts; add the amounts vertically and horizontally, and prove the correctness of the work by adding your results:—

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	TOTAL.
1st	\$65.95	\$24.89	\$79.79	\$40.78	\$37.59	\$89.61	.....
2nd	58.71	41.65	24.67	94.26	70.26	42.51	.....
3rd	47.58	99.57	50.60	80.71	91.82	89.76	.....
4th	29.69	70.80	87.91	74.93	36.63	21.90	.....
5th	81.45	56.93	54.82	96.57	12.72	96.67	.....
6th	42.63	68.77	81.79	60.86	31.87	75.82	.....
Totals	.....	.....	.....	.....	.....	.....	.....

(No marks will be allowed for this question, unless all the work is correctly done).

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2. A boy's age now is  $\frac{1}{3}$  of his father's. In six years it will be  $\frac{1}{2}$  of his father's present age. How old is he?

3. Some Atlantic liners consume 200 tons of coal per day. They average 8 days out and 8 back. In case of accidents they carry a supply for four days extra. How many cubic yards of the hold of such a steamer will be occupied with coal for her round trip if each ton is 33 cubic feet?

4. In a factory 12 men, 16 women and 30 boys are employed. At the end of a week they receive \$330. A man is paid as much as two women, and a woman as much as three boys. What is the share of each?

5. A farmer whose property is assessed at \$9,600, pays on the dollar  $1\frac{3}{4}$  mills for township rates;  $1\frac{1}{4}$  for county rates;  $1\frac{1}{2}$  for railway bonus; and  $2\frac{1}{2}$  for school rate. How much does he pay in all?

6. On June 29, 1890, I borrowed \$16.50, to be returned April 30, 1892. With interest at  $6\frac{1}{2}$  per cent., what amount must I then pay?

7. In what time would a field, 80 by 60 rods, pay for under-draining lengthwise at 2 cents per foot, if the field yield 2 bushels, at 66 cents, per acre more than before draining? The drains are 4 rods apart, and the first drain runs down the centre of the field.

8. If 18 men do  $\frac{2}{3}$  of a piece of work in 30 days of 10 hours, in what time should 15 men do the whole, working 9 hours a day?

9. Two men start from the same point at the same time to walk in the same direction around a block of land  $1\frac{1}{4}$  miles on each side. A goes at the rate of 4 miles and B 3 miles an hour. How far will A walk before he overtakes B?

*December, 1890.*

1. Write down the following statement of six weeks' cash receipts; add the amounts vertically and horizontally, and prove the correctness of the work by adding your results:

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	TOTAL.
1st	\$84.56	\$74.68	\$57.92	\$78.81	\$51.27	\$73.28	.....
2nd	73.55	65.43	81.47	86.57	74.23	36.19	.....
3rd	91.32	47.62	90.54	64.93	83.57	75.64	.....
4th	64.39	54.98	76.41	71.46	54.39	46.37	.....
5th	57.95	49.17	42.86	92.78	67.44	85.16	.....
6th	78.19	63.58	59.29	63.69	96.08	79.31	.....
Totals.	.....	.....	.....	.....	.....	.....	.....

2. A person sold A  $\frac{3}{4}$  of his land, B  $\frac{2}{3}$  of the remainder, C  $\frac{5}{6}$  of what then remained, and received \$50 for what he had left, at \$60 per acre. Find the number of acres he had at first.
3. A grocer bought 6 cwt. of sugar for \$52.10; he used 65 lbs. himself and sold the rest so as to make 12 cents per lb. profit on the whole quantity. How much per lb. did he sell it for?
4. A starts from Kingston to walk to Belleville, a distance of 45 miles, at  $3\frac{1}{2}$  miles an hour, and B starts from Belleville 3 hours earlier at  $2\frac{1}{2}$  miles an hour. Where do they meet, and how far will B be from Kingston when A arrives at Belleville?
5. A note for \$162.50, with interest at  $5\frac{1}{2}$  per cent., was given on January 14th, 1889, and paid on November 28th, 1890. What was the amount paid?
6. A certain hall 60 feet long is to be carpeted. It is found that by stretching the carpet lengthwise, any one of four pieces, width respectively  $3\frac{1}{2}$  yds., 1 yd.,  $1\frac{1}{4}$  yd., and  $1\frac{1}{2}$  yd., will exactly fit the hall without cutting anything from the width of the carpet. If the narrowest piece, worth \$1.10 per yard, be chosen, what will it cost to carpet the hall?
7. I bought a bush farm, 180 rods long by 96 rods wide, at \$12.50 per acre. I paid \$14.75 per acre for clearing and \$1.35 a rod for enclosing the whole farm with wire fencing. Taking into account that I sold the wood for \$1,160 and ashes for \$17.20, how much has the improved farm cost me per acre?
8. A loaned B \$120 for 1 year and 8 months and received as payment in full at the end of that time \$130.25. What rate per cent. interest did B pay?
9. A farmer sells a merchant 30 bushels of wheat at 90 cents per bushel and makes a profit of 20 per cent.; the merchant sells the farmer 5 yds. of broadcloth at \$3.60 per yd., 16 yds. of calico at 8 cents per yd., and 44 yards of cotton cloth at 13 cents per yd., and makes a profit of 25 per cent. Which gains the more by the transaction and how much?
- June, 1891.
- NOTE.** — Candidates are to take the first question and any six others. A maximum of five marks may be allowed for neatness.

- 1.** Write down the following statement of six weeks' cash receipts; add the amounts vertically and horizontally and prove the correctness of your work by adding the results :

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	TOTAL.
1st	\$75.59	\$62.68	\$59.63	\$62.78	\$67.36	\$91.34	.....
2nd	82.61	79.81	48.79	92.13	81.78	87.17	.....
3rd	56.95	49.83	89.64	47.85	73.81	79.68	.....
4th	91.04	75.16	46.98	39.67	59.76	95.79	.....
5th	68.17	34.75	77.63	85.94	93.19	86.97	.....
6th	47.80	81.14	67.19	49.85	48.77	98.99	.....
Totals.	.....	.....	.....	.....	.....	.....	.....

(No marks will be allowed for this question unless all the work is correctly done).

- 2.** A note of \$360, drawn April 20th, 1890, is paid July 2nd, 1891, with interest at  $7\frac{1}{2}$  per cent. per annum. Find the amount paid.
- 3.** Brooms are bought wholesale at \$20 a gross; what per cent. profit will be made by selling them at 20 cents each?
- 4.** Express, as a fraction of an acre, the sum of the following :  $\frac{1}{2}$  of  $\frac{4}{5}$  of  $\frac{1}{4}\frac{1}{2}$  of an acre ;  $\frac{2}{3}$  of  $\frac{1}{2}\frac{1}{4}$  of  $\frac{6}{5}\frac{2}{3}$  of 100 sq. rods;  $\frac{1}{7}\frac{1}{8}$  of  $2\frac{1}{8}$  times 605 sq. yards.
- 5.** A drover lost .065 of his flock by wolves, .105 by disease and .27 by theft. He then sold .75 of what remained, and has 280 sheep left. Find the number in his original flock.
- 6.** A legacy of \$9,500 is to be divided among A, B and C, so that A will get  $\frac{5}{19}$  of the whole, and B will get  $\frac{3}{4}$  as much as C. Find the shares of each.
- 7.** The difference in weight of two chests of tea is 25 lbs.; the value of both at 65 cents a lb. is \$113.75. How many lbs. of tea are in each chest?
- 8.** Find cost of digging a cellar 48 ft. long, 30 ft. wide and 6 ft. deep, at 20 cents per cubic yard, and flooring it with Portland cement at 10 cents per square yard.
- 9.** Farmer B sold to a merchant the following articles to apply on an overdue account of \$54.45 : 1,680 lbs. of hay at \$15 per ton,  $3\frac{3}{4}$  cords of wood at \$4.80 per cord, 4 bbls. of apples at \$2.75 per bbl., 350 lbs. of flour at \$2.50 per cwt., 30 lbs. 10 oz. butter at 16 cents per lb. Make out the account neatly, showing the balance, and to whom due.

*June, 1892.*

**NOTE.**—Candidates are to take the first question and any six others. In the first question four marks are to be allowed for FORM and twelve for the calculation; but no value shall be given for the calculation unless the result is absolutely correct. A maximum of five marks may be added for neatness.

1. Make out the following account, *neatly* and accurately, in proper form:

Nicholas Nickleby bought the goods from you on March 3rd, and paid you \$10 on account April 8th.

3½ lbs. tea, at 80c.  
 300 lbs. sugar, at 4½c.  
 45 yds. print, at 11½c.  
 2½ gallons syrup, at 65c.  
 12½ yds. towelling, at 12½c.  
 ¾ doz. knives and forks, at \$2.50.  
 27 lbs. cheese, at 15c.  
 1 lb. 10 oz. lemon peel, at 32c. per lb.

2. A load of wood, 10 ft. long, 3 ft. 8 inches wide, and 3 ft. high, was sold for \$3.

- (a) What was the price per cord?
- (b) At \$4 per cord what would the load be worth?

3. How much will it cost to paint the outside and both floors of a two-storey cottage, 36 feet long, 33 feet wide and 18 feet high, at 10c. per sq. yd.? The walls to be 18 inches thick, and no allowance to be made for cornices, openings or partitions.

4. What amount will be due July 1st, 1892, on a note of \$80, drawn February 6th, 1892, and bearing interest at  $5\frac{1}{4}$  per cent. per annum?

5. What is the smallest sum of money with which you can buy chickens at 25c., or geese at 50c., or turkeys at 75c., or lambs at \$3, or sheep at \$5, or pigs at \$7, or cows at \$35, or horses at \$140, and have exactly \$15 left for expenses?

6. A farmer agreed to pay his hired man ten sheep and \$160 for one year's labor. The man quit work at the end of seven months, receiving the sheep and \$60 as a fair settlement. Find the value of each sheep.

7. What decimal must be taken from the sum of  $69\frac{1}{6}$ , 8.2, 5.445, .065 and  $20\frac{1}{3}$ , so that it will contain 6.05 an exact number of times?

8. A lad earned \$21.16 collecting accounts for a physician. He was allowed  $5\frac{3}{4}$  per cent.; what amount did he collect?

9. S. S. No. 5, Esquesing, is assessed for \$150,000. The trustees have built a school-house costing \$1,800.

- (a) What will the school-house cost a ratepayer whose property is assessed for \$4,500?
- (b) What would be the rate of taxation per annum on the whole section if the house were paid for in six equal annual payments, without interest?

*June, 1893.*

1. A farmer exchanges  $3\frac{3}{4}$  tons of wheat at  $64\frac{1}{2}$ c. a bushel for coal at \$6.75 per ton. How many pounds of coal does he get?

2. Nathan Curd sells you 752 lbs. of cheese at  $11\frac{3}{4}$ c. per lb., and receives the following goods: (Make out the account in your own name, with place and date of this examination.)

11 yds. silk at \$2.25.
400 lbs. sugar at $4\frac{7}{8}$ c.
12 lbs. raisins at 11c.
96 lbs. nails at $3\frac{5}{8}$ c.
56 yds. grey cotton at $9\frac{3}{8}$ c.
11 yds. white cotton at 10c.
3 prs. gloves at 75c.

3. A school room is 30 ft. long, 24 ft. wide and 10 ft. high above the wainscotting. The trustees pay \$20 per thousand for a new floor; \$15 per thousand for a new board ceiling; 10c. per sq. yd. for painting the ceiling; 4c. per sq. yd. for tinting the walls, and \$2 per day for 6 days' labor. Find the total cost.

4. To drain a swamp in Dereham, the Township Council had a ditch dug one mile long, 3 ft. deep, 6 ft. wide at the surface and 4 ft. wide at the bottom. Find the total cost at 9 cents per cubic yd.

5. How many miles must be travelled by a team in ploughing lengthwise a piece of land 60 rods long and 40 rods wide, if each furrow is 10 inches wide?

6. Bought a horse for \$160 and gave in payment my note dated August 15th, 1892, with interest at  $7\frac{1}{2}$  per cent. per annum until paid. On Jan. 8th, 1893, I sold the horse for \$200 cash, and paid my note. What was my net gain?

7. A grocer receives \$9.60 for a bill of goods weighed on scales that gave only  $15\frac{1}{4}$  ounces to the lb. How many cents' worth did he cheat his customer?

8. The outfit of a livery stable is worth \$3000. One-seventh the value of the horses is equal to one-fifth the value of the vehicles, harness, etc. Find the value of the horses.

9. Write the following in figures :

- (a) Fifty thousand nine hundred and nine.
- (b) Nine hundred thousand and ninety.
- (c) Six hundred and fifty thousand seven hundred.
- (d) Eight hundred and seven thousand and eight.
- (e) Seven hundred and seventy thousand and sixty-seven.
- (f) Nine millions, ninety-nine thousand and ninety-nine.
- (g) Eighty millions, nine hundred thousand and thirty.
- (h) Nine hundred and seventy millions, eight hundred and eighty-seven thousand.
- (i) Six hundred and seventeen millions and ninety-three.
- (j) Nine hundred and nineteen thousand, four hundred and eleven.

*June, 1894.*

1. Make out in proper form and find the amount of the following bill :

June 1st, 1894. G. Murray & Co., sold to John Scott, Toronto, 4886 bus. 36 lbs. wheat, at 58c. a bus.; 4532 lbs. peas, at 52c. a bus.; 38 lbs. 3 pks. barley, at 54c. a bus.; 465 lbs. flour, at \$1.50 a cwt.; 4685 lbs. bran, at \$15 a ton. Write out a receipt in full for payment of account, 26th June.

2. The weight of a cubic foot of water is  $62\frac{1}{2}$  lbs., and an imperial gallon contains 277.274 cubic inches; find the weight in ounces of a pint of water.

3. The Manufacturers and Liberal Arts Building of the Columbian Fair was in the form of a rectangle and covered an area of 30 acres 76 rods 19 yds. 7 feet. The building was 787 feet wide. How many feet in length was it?

4. How many oranges must a boy buy and sell to make a profit of \$9.30, if he buys at the rate of 5 for 3 cents and sells at the rate of 4 for 3 cents?

5. A sells goods to B at a gain of 12 per cent and sells the same goods to C at a gain of  $7\frac{1}{2}$  per cent.; C paid \$76.00 for the goods. How much did A pay for them?

6. A gravel-bed whose surface has an area of 4 acres contains gravel to an average depth of 6 feet. How many miles of road 11 feet wide can be covered from the gravel in the bed, if it be spread on to a uniform depth of 8 inches?

7. On the 15th October, 1893, a young man deposited in the Savings Bank the sum of \$860.75. On the 20th May, 1894, he withdrew the principal and simple interest at 4 per cent. per annum. What amount did he withdraw?

8. A man spent  $\frac{5}{6}$  of his money for a house,  $\frac{3}{7}$  of the remainder for cattle, and the rest for a farm. If the farm cost him \$357 less than the house and cattle together, what did he pay for all?

9. (a) Simplify:  $\frac{3}{4} - (\frac{3}{7} \text{ of } \frac{1}{2}) \div (\frac{1}{3} \text{ of } \frac{1}{2}) + (1\frac{1}{2} \text{ of } 5)$   
 $\frac{1}{16} + (\frac{7}{12} \text{ of } 3\frac{1}{4}) - (\frac{7}{8} \text{ of } 1\frac{1}{2}) - \frac{1}{4} \quad 9\frac{1}{3} - 1\frac{2}{3}$

(b) Multiply 350.4 by .0105 and divide the product by .0000210.

1. 2  
2. 3  
3. 2  
4. 3

1. 3  
2. 1  
3. 9  
4. 6

1. 14  
2. 24  
3. 1  
4. 72

1. 64  
2. \$7  
3. 33  
4. 10

1. 24  
2. 71  
3. 40  
4. 63

1.  $\frac{7}{8}$  ;  
2.  $\frac{5}{15}$   
3. 64  
4. \$50

# ANSWERS.

## Exercise 1.

- |                            |               |                 |
|----------------------------|---------------|-----------------|
| 1. 2, 4; 2, 7; 3, 5; 3, 7. | 5. 2, 31.     | 9. 24.          |
| 2. 3, 11; 5, 13; 2, 13.    | 6. 2, 3 or 6. | 10. 225 sq. in. |
| 3. 2, 2, 3, 31.            | 7. 9.         | 11. 12 ft.      |
| 4. 392.                    | 8. 3, 7.      | 12. 3662.       |

## Exercise 2.

- |           |                 |           |
|-----------|-----------------|-----------|
| 1. 3 gal. | 5. 44020.       | 9. 7.     |
| 2. 14.    | 6. 17676.       | 10. \$6.  |
| 3. 9 in.  | 7. 18 bu. 3 pk. | 11. 11.   |
| 4. 60 lb. | 8. 47.          | 12. 8 rd. |

## Exercise 3.

- |                 |              |            |
|-----------------|--------------|------------|
| 1. 14, etc.     | 5. 11.       | 9. 212.    |
| 2. 24, etc.     | 6. 729.      | 10. 6 ft.  |
| 3. 1 gal. 2 qt. | 7. 70 cents. | 11. 5 doz. |
| 4. 72.          | 8. 13566.    | 12. 235.   |

## Exercise 4.

- |                    |           |                |
|--------------------|-----------|----------------|
| 1. 64 cu. ft.      | 5. 15 ft. | 9. \$91.       |
| 2. \$75.           | 6. 21 lb. | 10. 4 mi.      |
| 3. 336 ; 672, etc. | 7. 6 yr.  | 11. 6; 5.      |
| 4. 100300.         | 8. 1081.  | 12. 72 cu. yd. |

## Exercise 5.

- |                 |                       |                      |
|-----------------|-----------------------|----------------------|
| 1. 24 quarters. | 5. \$1.50.            | 9. 9587.             |
| 2. 71.          | 6. $9\frac{1}{2}$ pt. | 10. $6\frac{6}{7}$ . |
| 3. 40 barrels.  | 7. \$19.50.           | 11. $1\frac{9}{4}$ . |
| 4. 63.          | 8. $4\frac{4}{7}$ .   | 12. 128 bu.          |

## Exercise 6.

- |                                   |                                 |                          |
|-----------------------------------|---------------------------------|--------------------------|
| 1. $\frac{7}{8}; \frac{9}{13}$ .  | 5. $\frac{1}{4}; \frac{3}{8}$ . | 9. $9\frac{5}{6}$ bu.    |
| 2. $\frac{8}{15}, \frac{7}{20}$ . | 6. $21\frac{3}{5}$ .            | 10. \$653.94.            |
| 3. 64 cents.                      | 7. 36948; 26976.                | 11. \$26 $\frac{1}{2}$ . |
| 4. \$50.                          | 8. $7\frac{6}{7}$ lbs.          | 12. 60 cents.            |

**Exercise 7.**

- |                         |                                      |               |
|-------------------------|--------------------------------------|---------------|
| 1. $6\frac{3}{10}$ cwt. | 6. $119\frac{1}{3}$ ac.              | 9. \$108.90.  |
| 2. $\$5.$               | 7. 6 yd. 3 in.; 4 yd.<br>2 ft. 3 in. | 10. 82 cents. |
| 3. $26\frac{3}{4}$ yd.  | 8. $\frac{39}{10}$ .                 | 11. 276; 384. |
| 4. 300 rd.              |                                      | 12. \$104.75. |
| 5. 9947027.             |                                      |               |

**Exercise 8.**

- |                         |                         |                         |
|-------------------------|-------------------------|-------------------------|
| 1. $1\frac{5}{2}$ .     | 5. $41\frac{9}{20}$ ac. | 9. 2704.                |
| 2. $2\frac{3}{10}$ ton. | 6. 20; 100.             | 10. $8\frac{1}{10}$ yd. |
| 3. \$230.               | 7. \$283.               | 11. $18\frac{3}{5}$ mi. |
| 4. $17\frac{3}{8}$ .    | 8. $\frac{4}{15}$ .     | 12. \$7.                |

**Exercise 9.**

- |                           |                            |                           |
|---------------------------|----------------------------|---------------------------|
| 1. \$45 $\frac{3}{10}$ .  | 5. \$26 $\frac{52}{99}$ .  | 9. 23 men.                |
| 2. 1 gal. 1 qt.           | 6. 35.                     | 10. \$31 $\frac{7}{10}$ . |
| 3. \$18 $\frac{43}{69}$ . | 7. \$18 $\frac{21}{130}$ . | 11. 873.                  |
| 4. 8 in.                  | 8. 18 $\frac{3}{5}$ .      | 12. $20\frac{2}{11}$ .    |

**Exercise 10.**

- |                                    |   |                          |
|------------------------------------|---|--------------------------|
| 1. $7\frac{3}{10}$ .               | 5. $98\frac{2}{5}$ bu.; $106\frac{2}{7}$ bu.;<br>$102\frac{3}{4}$ bu. | 9. \$22176.              |
| 2. $1\frac{1}{3}$ ac.              | 6. 28.  | 10. $14\frac{2}{3}$ gal. |
| 3. 4 mi. 160 rd.; 3<br>mi. 120 rd. | 7. $27\frac{1}{3}$ rd.  | 11. 20 cents.            |
| 4. $285\frac{1}{6}$ ac.            | 8. $1\frac{1}{2}$ .   | 12. $\frac{7}{8}$ .      |

**Exercise 11.**

- |                         |                        |                   |
|-------------------------|------------------------|-------------------|
| 1. $\frac{73}{10}$ .    | 5. \$35.10.            | 9. \$40.          |
| 2. 12748715.            | 6. $\frac{237}{280}$ . | 10. \$2.70.       |
| 3. $2\frac{11}{60}$ mi. | 7. 16 ft.              | 11. 18 gal. 3 qt. |
| 4. $4939\frac{3}{4}$ .  | 8. \$2594\frac{3}{10}. | 12. \$31.85.      |

**Exercise 12.**

- |                           |                            |                         |
|---------------------------|----------------------------|-------------------------|
| 1. \$15 $\frac{10}{11}$ . | 5. \$1\frac{6}{11}.        | 9. 20 bu.               |
| 2. $\frac{4}{11}$ .       | 6. 64 cents.               | 10. $8\frac{1}{11}$ lb. |
| 3. 90 ac.                 | 7. $38\frac{5}{32}$ cents. | 11. 40 cents.           |
| 4. $1\frac{6}{11}$ .      | 8. $1\frac{11}{20}$ .      | 12. \$3.54\frac{3}{4}.  |

**Exercise 13.**

- |                            |                           |                            |
|----------------------------|---------------------------|----------------------------|
| 1. $93\frac{1}{4}$ .       | 5. 5 ft. 6 in.            | 9. $16\frac{3}{4}$ .       |
| 2. 3 bu.                   | 6. 73.                    | 10. 32 tons.               |
| 3. \$185 $\frac{1}{2}$ .   | 7. \$23 $\frac{11}{12}$ . | 11. $13\frac{5}{9}$ cents. |
| 4. 62 $\frac{1}{2}$ cents. | 8. 2 ft. 9 in.            | 12. 168 cu. ft.            |

1.  
2.  
3.  
4.1. 8.  
2. 3.  
3. 8.  
4. 4.1. 1.  
2. 5.  
3. 9.  
4. 2.1. 9.  
2. 9.  
3. 2.  
4. 7.1. 48.  
2. 1.  
3. \$8.  
4. 32.1. 45.  
2.  $\frac{3}{28}$ .  
3. 35.  
4. 94.1. 1 t.  
2. 32.  
3. 25.  
4. 32.  
5. 32.

**Exercise 14.**

- |                            |                          |                         |
|----------------------------|--------------------------|-------------------------|
| 1. \$17.                   | 5. \$1 $\frac{1}{2}$ .   | 9. 6 lb.                |
| 2. 9 $\frac{8}{11}$ cents. | 6. 10 cents.             | 10. 6 doz.              |
| 3. 22 ft.                  | 7. 215 $\frac{1}{2}$ mi. | 11. \$58.50.            |
| 4. 12 boys.                | 8. 1 $\frac{1}{5}$ oz.   | 12. \$1 $\frac{1}{2}$ . |

**Exercise 15.**

- |                         |                          |              |
|-------------------------|--------------------------|--------------|
| 1. 8 $\frac{21}{5}$ lb. | 5. 8580.                 | 9. 60 cents. |
| 2. \$6.                 | 6. \$2 $\frac{61}{70}$ . | 10. 140.     |
| 3. \$2000.              | 7. \$2 $\frac{2}{5}$ .   | 11. \$61.20. |
| 4. 4.                   | 8. 20 cents; 16 cents.   | 12. \$750.   |

**Exercise 16.**

- |              |                             |                         |
|--------------|-----------------------------|-------------------------|
| 1. 18.       | 5. 76 $\frac{1}{2}$ sq. yd. | 9. \$16800.             |
| 2. 50 yd.    | 6. 36.844.                  | 10. \$2 $\frac{9}{7}$ . |
| 3. \$69.     | 7. \$135 $\frac{9}{7}$ .    | 11. 47 ac. 112 sq. rd.  |
| 4. 24 plums. | 8. \$182.50.                | 37 ac. 80 sq. rd.       |
|              |                             | 12. \$3510.             |

**Exercise 17.**

- |                            |                  |                 |
|----------------------------|------------------|-----------------|
| 1. \$55.76 $\frac{1}{8}$ . | 5. \$4.50; \$27. | 9. 52 ft.       |
| 2. \$250.                  | 6. \$3.          | 10. 60 marbles. |
| 3. 25 lb.                  | 7. 2 men.        | 11. 8 yr.       |
| 4. 75 cts; \$1; \$1.75.    | 8. 60 cents.     | 12. \$8.70      |

**Exercise 18.**

- |                       |                        |  |
|-----------------------|------------------------|--|
| 1. 48 lb.             | 5. 1 $\frac{1}{2}$ lb. | 9. \$165; \$180; \$155.                        |
| 2. 1 $\frac{1}{2}$ .  | 6. \$5.75.             | 10. 90.  |
| 3. \$665.28.          | 7. 1 $\frac{1}{7}$ .   | 11. 23 $\frac{7}{8}$ lb.; 27 $\frac{1}{8}$ lb. |
| 4. 48 $\frac{1}{2}$ . | 8. 105 mi.             | 12. \$14.                                      |

**Exercise 19.**

- |                         |                      |                              |
|-------------------------|----------------------|------------------------------|
| 1. 45 cents.            | 5. 12 months.        | 9. \$4166.66 $\frac{2}{3}$ . |
| 2. $\frac{3}{28}$ ac.   | 6. 30 ft.            | 10. \$2; \$3; \$2.20.        |
| 3. 35 cents; 6 cents.   | 7. 3 $\frac{1}{7}$ . | 11. \$1200.                  |
| 4. 94 $\frac{1}{2}$ ac. | 8. \$15.             | 12. 3 hens.                  |

**Exercise 20.**

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|------------------------|---|-------------------------------------|
| 1. 1 ton 642 lb. 4 oz. | 6. 215 $\frac{1}{2}$ gal.; 119 $\frac{1}{4}$ gal. | 9. 2 $\frac{1}{4}$ yd.              |
| 2. 32 cents.           | 7. 17 $\frac{1}{2}$ cwt.                          | 10. \$1400.                         |
| 3. 250 doz.            | 8. \$21.49.                                       | 11. 14.                             |
| 4. 32.                 |   | 12. 5 yd. 1 ft. 5 $\frac{1}{2}$ in. |
| 5. 32 ac.              |   |                                     |

**Exercise 21.**

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|---------------------|--------------------------|-------------------------|
| 1. \$6 ; \$5.       | 6. 46 bu. 2 pk. 3 qt.    | 11. \$43 ; \$45 ; \$39; |
| 2. \$20.            | 7. \$1.50.               | \$45.                   |
| 3. $1\frac{1}{2}$ . | 8. 7 hr.                 | 12. 9 mi. 73 rd. 2 yd.  |
| 4. \$20.10.         | 9. 44 tons 16 cwt. 4 lb. | 1 ft. 6 in.             |
| 5. 2800 lb.         | 10. 38.                  |                         |

**Exercise 22.**

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|--------------------|----------------------|-------------------------|
| 1. $\frac{3}{4}$ . | 6. 105.              | 10. 20 cts.             |
| 2. 8 cents.        | 7. 30 cts.           | 11. 9 sq. yd. 6 sq. ft. |
| 3. \$1.20.         | 8. $3\frac{9}{32}$ . | 36 sq. in.              |
| 4. 9 men.          | 9. 1000 gal.         | 12. \$12 ; \$8 ; \$3.   |
| 5. 8 cwt. 72 lb.   |                      |                         |

**Exercise 23.**

- |                           |                        |                              |
|---------------------------|------------------------|------------------------------|
| 1. $1\frac{5}{7}$ .       | 5. \$98.               | 9. $1\frac{1}{2}\text{ lb.}$ |
| 2. 40.                    | 6. 4 papers.           | 10. \$1.62 due you.          |
| 3. $\frac{3}{25}$ .       | 7. $1\frac{25}{132}$ . | 11. \$17.36.                 |
| 4. \$4.80 ; \$2.80 ; \$2. | 8. 24 men.             | 12. 20 ft.                   |

**Exercise 24.**

- |                                       |              |                |
|---------------------------------------|--------------|----------------|
| 1. 775 lb.                            | 5. 84 ft.    | 9. 9 ft. 6 in. |
| 2. $1\frac{2}{3}\text{ lb.}$          | 6. 48 cents. | 10. \$368.64.  |
| 3. 70 cents ; 60 cents ;<br>40 cents. | 7. 20 ; 10.  | 11. 6.         |
| 4. \$1.05.                            | 8. \$6.      | 12. 15 ac.     |

**Exercise 25.**

- |                        |                                       |   |
|------------------------|---------------------------------------|---|
| 1. 45 ft.              | 6. 12 hr.                             | 10. $5\frac{37}{60}$ .                            |
| 2. 5 horses.           | 7. 4 lbs. 4 oz.                       | 11. $1957\frac{1}{3}$ lb.                         |
| 3. \$4000.             | 8. \$1035.                            | 12. $\frac{1}{6} ; \frac{7}{30} ; \frac{3}{10}$ . |
| 4. 10 rolls.           | 9. 20 cents ; 40 cents ;<br>80 cents. |   |
| 5. $\frac{105}{398}$ . |                                       |   |

**Exercise 26.**

- |  |              |                                |
|--|--------------|--------------------------------|
| 1. \$1.62 you owe.   | 4. 72 cents. | 9. \$435.60.                   |
| 2. 91 sq. rd. 12 sq. yd.<br>8 sq. ft. 97 $\frac{1}{4}$ sq. in. | 5. 6 min.    | 10. $10\frac{13}{16}$ .        |
| 3. 10 bundles.   | 6. 153.      | 11. 5 lb. ; 15 lb. ; 60<br>lb. |
|  | 7. 5 days.   | 12. \$189.                     |
|  | 8. 18 cents. |                                |

**Exercise 27.**

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|-------------------------------|-----------------|------------------------------------|
| 1. 7776 sq. in.               | 5. \$37.50.     | 9. $\frac{1}{3}$ ; $\frac{2}{3}$ . |
| 2. 3 $\frac{3}{4}$ lb.; 6 lb. | 6. 18; 36; 108. | 10. 12 ft.; 9 in.                  |
| 3. 2 cows.                    | 7. 264 ft.      | 11. 10368.                         |
| 4. \$9.86.                    | 8. 36 sq. in.   | 12. 80 cents.                      |

**Exercise 28.**

- |                          |                          |                     |
|--------------------------|--------------------------|---------------------|
| 1. 3 $\frac{5}{8}$ hr.   | 5. 6 tons 417 lb. 11 oz. | 9. 20 min.          |
| 2. 20 mi.                | 6. 14 days.              | 10. 80; 100; 20.    |
| 3. 140 $\frac{1}{2}$ yd. | 7. 95 cents; 5 cents.    | 11. \$227.70.       |
| 4. \$11925.28.           | 8. 8 ft. 3 in.           | 12. $\frac{1}{2}$ . |

**Exercise 29.**

- |                       |                         |                |
|-----------------------|-------------------------|----------------|
| 1. $\frac{5}{15}$ .   | 5. 5'501.               | 9. 95'70236 ac |
| 2. $\frac{75}{105}$ . | 6. 70 men.              | 10. 10 hr.     |
| 3. .0546875.          | 7. 29'9498.             | 11. \$24000.   |
| 4. \$36.              | 8. \$360; \$320; \$120. | 12. 15.        |

**Exercise 30.**

- |                          |                     |                           |
|--------------------------|---------------------|---------------------------|
| 1. .0073.                | 5. $\frac{3}{15}$ . | 9. 42 ct.; 43 ct.; 14 ct. |
| 2. \$4.                  | 6. 370'7042.        | 10. 90 cents.             |
| 3. 50'05.                | 7. 5 days.          | 11. .323.                 |
| 4. 114 $\frac{1}{2}$ yd. | 8. 3'993.           | 12. 70 hr.                |

**Exercise 31.**

- |                      |                        |                |
|----------------------|------------------------|----------------|
| 1. .758.             | 5. 14 mi. 68 rd. 4 yd. | 9. 109 sq. rd. |
| 2. 7 days.           | 2 ft. 6 in.            | 10. 10 mi.     |
| 3. $1\frac{5}{21}$ . | 6. .394.               | 11. \$78.      |
| 4. .078.             | 7. \$7.68.             | 12. 11.        |
|                      | 8. \$5 $\frac{1}{2}$ . |                |

**Exercise 32.**

- |                    |                    |                       |
|--------------------|--------------------|-----------------------|
| 1. 176'34.         | 5. .000010201.     | 9. .08322.            |
| 2. $\frac{4}{3}$ . | 6. 88; 68; 44.     | 10. 32 ft.            |
| 3. 20'832 tons.    | 7. 301'056 sq. yd. | 11. \$119.04.         |
| 4. 12 hr.          | 8. $\frac{1}{3}$ . | 12. $\frac{1}{11}$ r. |

**Exercise 33.**

- |             |             |                                   |
|-------------|-------------|-----------------------------------|
| 1. \$2050.  | 5. 715392.  | 9. \$1.56.                        |
| 2. 4 ft.    | 6. 54 bu.   | 10. \$13.50.                      |
| 3. \$37.70. | 7. \$22.90. | 11. $\frac{1}{2}\frac{1}{3}$ day. |
| 4. 2 weeks. | 8. 34 cents | 12. 356 ft.                       |

**Exercise 34.**

- |                 |             |                              |
|-----------------|-------------|------------------------------|
| 1. 7·563 lb.    | 5. 3·84.    | 9. ·00081.                   |
| 2. 1056 cu. ft. | 6. 6 lb.    | 10. 10 rd. 2yd. 1ft. 6in.    |
| 3. 16080.       | 7. 7·92 in. | 11. \$355·62 $\frac{1}{2}$ . |
| 4. 8 hr.        | 8. \$20.    | 12. $\frac{281}{480}$ .      |

**Exercise 35.**

- |                      |                                    |               |
|----------------------|------------------------------------|---------------|
| 1. 104·5 cents.      | 5. 18000.                          | 9. \$21·0924. |
| 2. 9 $\frac{7}{8}$ . | 6. $2\frac{2}{3}\frac{1}{2}$ days. | 10. 15 yd.    |
| 3. 10·001.           | 7. 36·35.                          | 11. 5·649.    |
| 4. \$1000.           | 8. 90 ct.; 60 ct; 40 ct.           | 12. \$27.     |

**Exercise 36.**

- |                |                             |                        |
|----------------|-----------------------------|------------------------|
| 1. 33·2 rd.    | 5. 5 dy. 11 hr. 52 min.     | 9. 4 days.             |
| 2. 70 cents.   | 48 sec.                     | 10. 3 pk. 1 gal. 2 qt. |
| 3. ·046875 oz. | 6. $\frac{27}{4}$ sq. inch. | 1 pt.                  |
| 4. \$14.       | 7. 50 doz.                  | 11. \$72 ; \$108.      |
|                | 8. \$3.20.                  | 12. 50 cents.          |

**Exercise 37.**

- |                |                            |               |
|----------------|----------------------------|---------------|
| 1. \$1.25.     | 5. 180 ac.; 60 ac.; 30 ac. | 9. 4 men.     |
| 2. ·04.        | 6. 15·5125 cwt.            | 10. .0078125. |
| 3. 5 ft. 6 in. | 7. \$117.                  | 11. \$12.     |
| 4. 3·775 mi.   | 8. 25000.                  | 12. 3·29.     |

**Exercise 38.**

- |                        |                         |                                    |
|------------------------|-------------------------|------------------------------------|
| 1. $1\frac{7}{16}$ .   | 6. $22\frac{1}{2}$ sec. | 11. 6 per cent.                    |
| 2. 23200 lb.           | 7. $4\frac{3}{16}$ sec. | 12. 4 hr. $21\frac{9}{11}$ min.; 4 |
| 3. 40 per cent.        | 8. 3 mi.                | hr. $54\frac{6}{11}$ min.; 4       |
| 4. \$120; \$50; \$370. | 9. \$3.                 | hr. $5\frac{5}{11}$ min.; 4 hr.    |
| 5. $1\frac{1}{16}$ .   | 10. $6\frac{2}{3}$ yd.  | $38\frac{2}{11}$ min.              |

**Exercise 39.**

- |                             |                 |                           |
|-----------------------------|-----------------|---------------------------|
| 1. $7\frac{1}{2}$ per cent. | 6. 27 days.     | 10. 7 o'clock.            |
| 2. \$3.72; \$2.46.          | 7. 64 per cent. | 11. $1\frac{1}{65}$ .     |
| 3. 3 oz.                    | 8. 175 ac.      | 12. 4 sq. rd. 1 sq. yd. 1 |
| 4. \$36; \$12.              | 9. 5 per cent.  | sq. ft.                   |
| 5. 165 rd.                  |                 |                           |

**Exercise 40.**

- |                      |                |   |
|----------------------|----------------|---|
| 1. 50 per cent.      | 5. 20 cents.   | 9. 25 cents.                                |
| 2. $\frac{3}{2}$ oz. | 6. \$1.54.     | 10. \$36.80.                                |
| 3. 100 per cent.     | 7. \$81; \$45. | 11. \$6 $\frac{2}{7}$ ; \$5 $\frac{1}{2}$ . |
| 4. 48; 36.           | 8. \$381.      | 12. \$3.50.                                 |

**Exercise 41.**

- |                    |           |                     |
|--------------------|-----------|---------------------|
| 1. \$6.80.         | 5. \$150. | 9. $1\frac{1}{2}$ / |
| 2. 112.88.         | 6. 81 lb. | 10. 12 weeks.       |
| 3. \$1.68.         | 7. 6 %.   | 11. \$175.          |
| 4. $\frac{2}{3}$ . | 8. 44.    | 12. 28 cents.       |

**Exercise 42.**

- |                        |           |                 |
|------------------------|-----------|-----------------|
| 1. \$750.              | 5. \$96.  | 9. 6 %.         |
| 2. \$2095.82.          | 6. 84.    | 10. \$1700.     |
| 3. \$378.              | 7. \$640. | 11. 12 %        |
| 4. $1\frac{3}{16}$ hr. | 8. \$60.  | 12. 100 cu. ft. |

**Exercise 43.**

- |               |              |                               |
|---------------|--------------|-------------------------------|
| 1. 69 cents.  | 5. 12 mills. | 9. 12 cents.                  |
| 2. \$1108.80. | 6. 3 days.   | 10. 9:35 A.M.                 |
| 3. \$1.44.    | 7. \$2.20.   | 11. $33\frac{1}{3}$ per cent. |
| 4. \$200.     | 8. 12 cows.  | 12. 20 ; 21 ; 41.             |

**Exercise 44.**

- |                        |                       |                         |
|------------------------|-----------------------|-------------------------|
| 1. $66\frac{2}{3}\%$ . | 5. $22\frac{2}{5}$ %. | 9. 55 %.                |
| 2. 5 ft.               | 6. 60 cents.          | 10. 1500 lb.            |
| 3. 25 %.               | 7. \$1.50 : 4 %.      | 11. \$5450.             |
| 4. $3\frac{7}{8}$ .    | 8. 20 hr.             | 12. $22\frac{1}{2}$ bu. |

**Exercise 45.**

- |                 |                    |                        |
|-----------------|--------------------|------------------------|
| 1. \$22400.     | 5. 20 cents.       | 9. \$40 ; \$50 ; \$80. |
| 2. \$8.40.      | 6. $\frac{2}{3}$ . | 10. $20^{\circ}$ .     |
| 3. \$48.75.     | 7. 100 gall.       | 11. 4 years.           |
| 4. 1 ft. 11 in. | 8. 60 %.           | 12. $14\frac{2}{7}$ .  |

**Exercise 46.**

- |                        |                          |                     |
|------------------------|--------------------------|---------------------|
| 1. $37\frac{1}{2}\%$ . | 5. $6\frac{2}{3}$ ; \$2. | 9. $2\frac{1}{3}$ . |
| 2. \$65.40.            | 6. 4 hr.                 | 10. 10 cents.       |
| 3. 20 %.               | 7. \$9 ; \$3.50.         | 11. 64.             |
| 4. \$2400.             | 8. \$1.35.               | 12. 40 cents.       |

**Exercise 47.**

- |                       |                              |  |
|-----------------------|------------------------------|--|
| 1. \$600.             | 5. $66\frac{2}{3}$ per cent. | 9. 30 cents.   |
| 2. $3\frac{3}{4}$ hr. | 6. $2\frac{1}{2}$ days       | 10. $2\frac{1}{2}$ lb. ; $3\frac{1}{2}$ lb. ; $2\frac{3}{4}$ lb. |
| 3. 36 cents.          | 7. $33\frac{1}{3}$ cent.     | 11. 24 per cent.   |
| 4. \$8640.            | 8. $2\frac{1}{2}\%$ .        | 12. 1800 lb.   |

**Exercise 48.**

- |                     |                           |                      |
|---------------------|---------------------------|----------------------|
| 1. $\frac{1}{25}$ . | 5. \$44.                  | 9. \$140.80.         |
| 2. 12 mi.           | 6. \$1.20; 40 ct.; 20 ct. | 10. 102 lb.; 120 lb. |
| 3. \$45             | 7. \$169.                 | 11. 3456.            |
| 4. $\frac{1}{6}$ .  | 8. 2 ft. 4 in.            | 12. 50 lb.           |

**Exercise 49.**

- |                            |                       |                       |
|----------------------------|-----------------------|-----------------------|
| 1. \$257.60.               | 5. \$28.80.           | 9. \$737.87           |
| 2. 80 ct.; \$1.20; \$1.50. | 6. 50 cents.          | 10. $\frac{3}{8}$ mi. |
| 3. \$1.68.                 | 7. \$64.              | 11. 35 per cent.      |
| 4. 125.                    | 8. $8\frac{1}{2}$ hr. | 12. 100 sheep.        |

**Exercise 50.**

- |                              |                            |                         |
|------------------------------|----------------------------|-------------------------|
| 1. \$15.69 +.                | 5. \$22.68 $\frac{1}{2}$ . | 9. \$246.               |
| 2. 4 mi.; $3\frac{1}{4}$ mi. | 6. 7 pints.                | 10. 66 rd.              |
| 3. \$700.                    | 7. 4000.                   | 11. 3 years.            |
| 4. \$850; \$200; \$600.      | 8. 20 cents.               | 12. A 33 dys; B 66 dys. |

**Exercise 51.**

- |                             |                                 |                             |
|-----------------------------|---------------------------------|-----------------------------|
| 1. \$199.10 $\frac{3}{4}$ . | 6. $12\frac{5}{8}$ sq. ft.      | 9. $6\frac{1}{2}$ per cent. |
| 2. 36 cents; 24 cents.      | 7. 7 per cent.                  | 10. 20 cents.               |
| 3. 4 years.                 | 8. 114 bu.; 190 bu.;<br>114 bu. | 11. \$915.                  |
| 4. 36 hrs.; 45 hrs.         |                                 | 12. $\frac{4}{15}$ .        |
| 5. \$2400.                  |                                 |                             |

**Exercise 52.**

- |              |                |                             |
|--------------|----------------|-----------------------------|
| 1. \$146.09. | 5. \$2400.     | 9. $6\frac{3}{8}$ per cent. |
| 2. 16; 24.   | 6. 8 days.     | 10. 2420.                   |
| 3. 10 years. | 7. 8 per cent. | 11. 30 years.               |
| 4. 15 in.    | 8. 90 cents.   | 12. \$700.                  |

**Exercise 53.**

- |                         |              |               |
|-------------------------|--------------|---------------|
| 1. \$666.88.            | 5. 60 cents. | 9. \$40.      |
| 2. $173\frac{1}{4}$ lb. | 6. \$11200.  | 10. \$60.     |
| 3. \$398.51 +.          | 7. 10%.      | 11. 70 cents. |
| 4. 105 acres.           | 8. 24 days.  | 12. 1200 yd.  |

**Exercise 54.**

- |            |                            |                                    |
|------------|----------------------------|------------------------------------|
| 1. \$680.  | 6. 40 cts.; 60 cts.        | 10. 75%.                           |
| 2. 46 lb.  | 7. \$17.64.                | 11. \$60.                          |
| 3. \$4000. | 8. \$33.50 $\frac{1}{2}$ . | 12. Mary 30; Jane 12;<br>Ellen 21. |
| 4. \$18.   | 9. \$33.75.                |                                    |
| 5. \$8.44. |                            |                                    |

**Exercise 55.**

- |                  |                        |                 |
|------------------|------------------------|-----------------|
| 1. \$51.25.      | 5. \$10000.            | 9. \$400.       |
| 2. 900.          | 6. 7 mi.               | 10. \$18 ; \$6. |
| 3. Dec. 1, 1894. | 7. $12\frac{1}{2}\%$ . | 11. 22 mi.      |
| 4. 60 cents.     | 8. 30 cents.           | 12. 15 doz.     |

**Exercise 56.**

- |                        |                       |                   |
|------------------------|-----------------------|-------------------|
| 1. $21\frac{1}{4}\%$ . | 5. $4\frac{1}{5}$ ac. | 9. \$95.70.       |
| 2. $\frac{1}{2}$ mi.   | 6. 30 mi.             | 10. 45 lb.        |
| 3. $1\frac{1}{4}$ gal. | 7. 50 ac.             | 11. 6 in.         |
| 4. 14 per cent.        | 8. 15 cents.          | 12. 21 mi. 80 rd. |

## ADMISSION TO HIGH SCHOOLS.

*June, 1883.*

- |                                      |   |                               |
|--------------------------------------|---|-------------------------------|
| 1. Book ; 5783, Remr. 5.             | $\frac{314513}{362880}; \frac{441}{3765}$ . | 9. .00421.                    |
| 3086.                                | 6. 133 $\frac{1}{3}$ cwt.; 100 cwt.; 10.    | 4 hr. 21 $\frac{9}{11}$ min.; |
| 2. 1031 $\frac{1}{2}$ tons ; \$3300. | 13 $\frac{1}{3}$ cwt.                       | 4 hr. 5 $\frac{5}{11}$ min.;  |
| 3. \$29027.84 $\frac{1}{6}$ .        | 7. \$3.56 $\frac{1}{6}$ .                   | 4 hr. 38 $\frac{2}{11}$ min.; |
| 4. \$319.37 $\frac{1}{2}$ .          | 8. \$5.25 +.                                |                               |

*December, 1883.*

- |                                     |              |                          |
|-------------------------------------|--------------|--------------------------|
| 1. 726390, Remr. 1281.              | 5. 15.       | 8. 293 $\frac{1}{3}$ yd. |
| 2. \$36.08.                         | 6. .0014997. | 9. $\frac{1}{4}$ .       |
| 3. Not so ; 9 $\frac{8}{13}$ times. | 7. \$14.56.  | 10. \$4.81 +.            |
| 4. \$508 ; \$438 ; \$254.           |              |                          |

*June, 1884.*

- |   |  |                      |
|---|--|----------------------|
| 1. 7070.  | 5. \$8.76.                             | 8. 5000.             |
| 2. 149688 ; 119.                                | 6. 1 $\frac{3}{8}2\frac{21}{64}$ lb.   | 9. \$110.88.         |
| 3. .00278 +.                                    | 7. 28 $\frac{1}{3}$ hr. ; 36 hr. ; 10. | \$24.04 +. ; \$240 ; |
| 4. 7 $\frac{1}{3}\frac{1}{2}$ ; $\frac{1}{7}$ . | 48 hr.                                 | 8%.                  |

*December, 1884.*

- |  |                          |                                     |
|--|--------------------------|-------------------------------------|
| 1. 80407089.   | 5. 11 $\frac{1}{4}$ ft.  | 8. \$19.16 +.                       |
| 2. 221.  | 6. 7 days.               | 9. 4 hr. 19 $\frac{7}{11}$ min. ; 4 |
| 3. \$126.80 $\frac{3}{4}$ .                                | 7. 25 $\frac{5}{8}$ gal. | hr. 24 min.                         |
| 4. (a) 22 $\frac{3}{4}$ ; (b)<br>$\frac{26163}{2750000}$ . |                          |                                     |

*June, 1885.*

- |  |                            |  |
|--|----------------------------|--|
| 1. Book-work.                              | 5. 8 $\frac{1}{4}$ cents.  | 8. \$266 $\frac{2}{3}$ ; \$933 $\frac{1}{3}$ . |
| 2. $\frac{12}{17}\frac{1}{2}\frac{1}{2}$ . | 6. \$43.83 $\frac{3}{4}$ . | 9. 3 hr. 16 $\frac{4}{11}$ min. ; 3            |
| 3. 28.89927017.                            | 7. 16 $\frac{2}{3}$ years. | hr. 13 $\frac{1}{3}$ min.                      |
| 4. \$93.39 $\frac{1}{2}$ .                 |                            | 10. \$90.                                      |

*December, 1885.*

- |                             |                             |           |
|-----------------------------|-----------------------------|-----------|
| 1. 2, 3, 5, 7, 11.          | 5. .000372.                 | 8. \$132. |
| 2. $\frac{14}{23}$ ; 28152. | 6. \$323.12 $\frac{1}{2}$ . | 9. 4 hr.  |
| 3. \$1890.                  | 7. A yard ; a day ; a       |           |
| 4. 5 $\frac{1}{2}$ .        | sovereign.                  |           |

*July, 1886.*

- |                                     |                         |                          |
|-------------------------------------|-------------------------|--------------------------|
| 1. 12540280 $\frac{1}{2}$ ; 478969. | 4. \$14; 30 of each.    | 7. $\frac{1}{2}\%$ .     |
| 2. \$69.08.                         | 5. \$2000; 8 per cent.  | 8. $10\frac{1}{2}\%$ yd. |
| 3. \$526.70.                        | 6. \$424; \$364; \$212. |                          |

*December, 1886.*

- |                       |                           |   |
|-----------------------|---------------------------|---|
| 1. 52 times.          | 6. 5 years.               | 10. A No. is exactly<br>div. by 9 if the sum<br>of its digits is div.<br>by 9 without leav-<br>ing a remainder. |
| 2. .0001.             | 7. 27 cents.              |   |
| 3. $1\frac{1}{4}$ mi. | 8. $12\frac{1}{2}$ years. |   |
| 4. \$37.50.           | 9. \$9.90.                |   |
| 5. 30 cows.           |                           | 11. 84 lb.  |
|                       |                           | 12. \$60.   |

*July, 1887.*

- |            |                             |                             |
|------------|-----------------------------|-----------------------------|
| 1. 354025. | 4. $\frac{27}{32}$ .        | 7. \$250 loss.              |
| 2. \$300.  | 5. \$685.71 $\frac{3}{4}$ . | 8. $8\frac{3}{4}$ months.   |
| 3. \$1000. | 6. 12 lb.                   | 9. $6\frac{1}{4}$ per cent. |

*December, 1887.*

- |             |                          |                    |
|-------------|--------------------------|--------------------|
| 1. 205.     | 5. 2560 ac.              | 9. 4928 cu. ft.    |
| 2. 2700 mi. | 6. First man; \$27.      | 10. \$1200; \$900. |
| 3. \$3.00.  | 7. $909\frac{1}{11}$ oz. | 11. 779.0 gal.     |
| 4. \$700.   | 8. \$720.                |                    |

*July, 1888.*

- |                                      |                    |                     |
|--------------------------------------|--------------------|---------------------|
| 1. Book-work.                        | 4. \$412500.       | 7. 12 men.          |
| 2. $190\frac{29}{35}$ .              | 5. \$240.          | 8. 24 rd. by 18 rd. |
| 3. 10.52 P.M.; 246 $\frac{2}{3}$ mi. | 6. 14580 shingles. | 9. \$12937.50       |

*December, 1888.*

- |                      |                              |                             |
|----------------------|------------------------------|-----------------------------|
| 1. \$1169.35.        | 4. \$15.67 +.                | 7. \$17.50.                 |
| 2. \$2.80.           | 5. $33\frac{1}{3}$ per cent. | 8. $307\frac{5}{9}$ sq. yd. |
| 3. \$56.70; \$25.90. | 6. 3627 cords.               |                             |

*July, 1889.*

- |                |                       |               |
|----------------|-----------------------|---------------|
| 1. 70 barrels. | 4. $4\frac{2}{3}$ ft. | 7. \$43.75.   |
| 2. \$117.08 +. | 5. 13310.             | 8. \$448.80.  |
| 3. 24 mi.      | 6. 60480 ac.          | 9. \$1171.41. |

*December, 1889.*

- |                                   |                         |  |
|-----------------------------------|-------------------------|--|
| 1. 80 cents.                      | 5. \$320.               | 8. \$4076.16 $\frac{3}{10}$ ; $\frac{431}{10}$ . |
| 2. \$9.16 +.                      | 6. $170\frac{2}{3}$ yd. | 9. 20+ per cent.                                 |
| 3. $54\frac{1}{2}\frac{3}{8}$ mi. | 7. \$2.20.              | 10. \$2648.78.                                   |
| 4. \$349.71 $\frac{9}{16}$ .      |                         |  |

*July, 1890.*

- |                               |                          |              |
|-------------------------------|--------------------------|--------------|
| 1. \$2213.47.                 | 4. \$158.40 ; \$105.60 ; | 7. 10 years. |
| 2. 9 years.                   | \$66.                    | 8. 60 days.  |
| 3. 4888 $\frac{2}{9}$ cu. yd. | 5. \$67.20.              | 9. 20 mi.    |
|                               | 6. \$18.47 +.            |              |

*December, 1890.*

- |               |                                   |                             |
|---------------|-----------------------------------|-----------------------------|
| 1. \$2495.08. | 4. 21 $\frac{1}{2}$ mi. from K. ; | 7. \$23.25.                 |
| 2. 100 ac.    | 5. $5\frac{1}{4}$ mi.             | 8. $5\frac{1}{2}$ per cent. |
| 3. 11 cents.  | 5. \$179.22 +.                    | 9. The merchant ; 50c.      |
|               | 6. \$440.                         |                             |

*June, 1891.*

- |                 |                                 |                    |
|-----------------|---------------------------------|--------------------|
| 1. \$2543.22.   | 4. $\frac{7}{8}$ ac.            | 7. 100 ; 75.       |
| 2. \$392.40.    | 5. 2000 sheep.                  | 8. \$80.           |
| 3. 44 per cent. | 6. \$2500 ; \$3000 ;<br>\$4000. | 9. 80 cents due B. |

*June, 1892.*

- |  |             |                                     |
|--|-------------|-------------------------------------|
| 1. \$31.89 $\frac{1}{4}$ .                                   | 4. \$81.68. | 8. \$368.                           |
| 2. (a) \$3.49 $\frac{1}{11}$ ; (b)<br>\$3.43 $\frac{3}{4}$ . | 5. \$435.   | 9. (a) \$54 ; (b) 2 mills<br>on \$. |
| 3. \$49.60.  | 6. \$8.     |                                     |
|  | 7. '11.     |                                     |

*June, 1893*

- |                             |                          |               |
|-----------------------------|--------------------------|---------------|
| 1. 22933 $\frac{1}{2}$ lb.  | 4. \$264.                | 7. 45 cents.  |
| 2. You owe Curd<br>\$30.71. | 5. 148 $\frac{1}{2}$ mi. | 8. \$1750.    |
| 3. \$50.                    | 6. \$35.20               | 9. Book-work. |

*June, 1894.*

- |                                     |                  |                                    |
|-------------------------------------|------------------|------------------------------------|
| 1. \$2916.45 $\frac{1}{2}$ .        | 4. 6200 oranges. | 7. \$881.21 +.                     |
| 2. 20 $\frac{3}{4}\frac{7}{12}$ oz. | 5. \$3125.       | 8. \$2261.                         |
| 3. 1687 ft.                         | 6. 27 mi.        | 9. (a) $\frac{1}{3}$ ; (b) 168000. |

# ONTARIO EDUCATION DEPARTMENT

## EXAMINATION PAPERS

### PUBLIC SCHOOL LEAVING.

*June, 1892.*

1. (a) What is meant by the prime factor of a number?
- (b) Find the prime factors of 13230, 22050, and 23625, and
- (c) By means of the prime factors find their G.C.M. and L.C.M.

2. A man owned \$8,940 Bank Stock which paid a yearly dividend of  $4\frac{1}{2}$  per cent. He sold out at  $102\frac{1}{2}$  and invested the proceeds in Michigan Central Stock at  $7\frac{1}{2}$ , paying a yearly dividend of 3 per cent. By how much was his yearly income changed by the transfer?

3. Find the proceeds of the following note:

\$2,400.00.

HAMILTON, February 3rd, 1892.

Five months after date, value received, I promise to pay Thomas Cowan, or order, the sum of Two Thousand Four Hundred Dollars, at Bank of Hamilton here, with interest at 6 per cent. per annum.

VANCE ALLEN.

Discounted May 22nd, 1892, at 7 per cent. (Year = 366 days.)

4. A machinist sold two seed-drills for equal sums of money. He gained 25 per cent. on the one and lost 25 per cent. on the other. His total loss was \$9.60. Find the cost of each drill.

5. A commission merchant sells a consignment of wheat for \$27,500, on a commission of  $2\frac{1}{2}$  per cent. He pays \$250 for freight and storage, and with the net proceeds buys pork at \$6.25 per cwt., charging  $2\frac{1}{2}$  per cent. for buying. How many cwt. of pork does he buy and what is the amount of his two commissions?



# MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



APPLIED IMAGE Inc

1653 East Main Street  
Rochester, New York 14609 USA  
(716) 482 - 0300 - Phone  
(716) 288 - 5989 - Fax

6. Find the cost of the material required to fence  $2\frac{1}{2}$  miles of railway (both sides), posts placed 8 feet apart, an 8 inch base 1 inch thick, a 2x4 rail at top, and 6 strands of wire. The posts cost  $12\frac{1}{2}$ c. each, the lumber \$14 a thousand, and the wire 4c. per lb. (A lb. of wire stretches one rod.)

7. (a) A circular cistern, 8 feet in diameter and 9 feet in depth, is filled with water to the height of 6 feet. How many gallons of water in the cistern? (A cubic foot of water weighs 1,000 oz., and a gallon 10 lbs.)

(b) If a sphere whose diameter is 4 feet is submerged in the water in the cistern, how high will it cause the water to rise?

8. Add vertically and horizontally the following statement of eight weeks' cash receipts :

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	Total.
1st .....	\$3,862 93	\$1,391 76	\$6,760 68	\$1,098 91	\$1,696 65	\$ 43 68	
2nd .....	396 74	6,168 37	864 39	964 26	167 69	1,864 86	
3rd .....	1,768 63	467 89	2,035 68	3,165 03	791 83	785 97	
4th .....	3,976 98	76 05	364 76	93 68	1,948 39	1,759 46	
5th .....	263 76	1,035 84	36 10	386 41	3 45	1,396 71	
6th .....	1,559 83	1,932 57	1,268 15	8 37	279 72	67 85	
7th .....	62 24	318 62	134 36	1,763 29	1,468 29	543 66	
8th .....	194 87	3 85	7,643 82	685 38	765 42	39 67	
Total ..							

June, 1893.

1. (a) What is meant by a common multiple of two or more fractions?

(b) Find the L. C. M. of  $2\frac{1}{4}$ ,  $3\frac{3}{8}$ ,  $3\frac{9}{32}$ ,  $14\frac{9}{14}$ .

2. Express in decimals accurately to seven places :

$$\frac{1}{5} + \frac{1}{3 \times 5^3} + \frac{1}{5 \times 5^5} + \frac{1}{7 \times 5^7}$$

3. A boy can run six times around a circular plot of ground in 52 seconds, another boy can run nine times round the same plot in 80 seconds. If they start from the same place at the same time, and run in the same direction, how many rounds will each make before the faster boy overtakes the slower?

4. A clerk pays \$7.50 taxes on his salary. What is his total salary if \$400 of it is exempt from taxation and a  $2\frac{1}{2}$  per cent. rate is levied on the remainder?

5. A miller bought 20,000 bushels of wheat and had it insured for  $\frac{1}{5}$  of its cost, at  $1\frac{1}{16}$  per cent., paying a premium of \$136. At what price per bushel must he sell it to gain 20 per cent.?

6. For what sum must a note be drawn on June 1st, 1893, payable in 90 days, so that when discounted on June 14th at 8 per cent. the proceeds will be \$717.20 ?

7. I own \$6,000 of Bank Stock, paying an annual dividend of 5 per cent. How much will my annual revenue from the Bank Stock be reduced by selling enough of it at 72 to pay a note of \$3735 nine months before it is due, reckoning true discount at 5 per cent. per annum ?

8. Charging interest at 6 per cent., what sum is due to-day, (June 29th), on the following ledger account :

*Dr.*

1893		\$	c.
Jan. 12	To Mdse., 30 days .....	130	00
Feb. 6	" 60 days .....	180	00
Mar. 8	" 90 days .....	460	00
April 4	" 30 days .....	362	00
May 12.	To cash .....	160	00

*Cr.*

1893		\$	c.
Feb. 18	By Cash .....	100	00
April 20	" .....	150	00
June 24	" .....	312	00

9. A square plot of ground that contains  $\frac{9}{16}$  of an acre is covered with cordwood (4 ft. long) to an average height of 12 ft. What is the wood worth at \$4.12 a cord ?

10. A town lot containing  $\frac{1}{5}$  of an acre is 4 rods wide. Find the total cost of the material for a picket fence around it of inch pickets 2" wide and 3' long, placed 2" apart, two stringers 2"  $\times$  4", and an inch base 14" wide, the lumber being worth \$16 per M, board measure ; posts 8 ft. 3 in. from centre to centre at 13 cents each ; nails \$1.15.

June, 1894.

1. Resolve 16335 and 18018 into their prime factors and from inspection of these write the prime factors of their (a) L.C.M. and (b) G.C.M.
2. Express in the form of a vulgar fraction the average of  $\frac{3}{8}$ ,  $\frac{3}{4}$ , 7,  $4\frac{1}{5}$ , and  $486\frac{1}{9}$ .
3.  $1\frac{1}{4}$  A man bought a bankrupt stock at 60c. on the \$ of the invoice price, which was \$4840. He sold half of it at 10 per cent. advance on invoice price, half the remainder at 20 per cent. below invoice price and the balance at 50 per cent. of invoice price. His expenses were 10 per cent. of his investment. Find his loss or gain (a) in money and (b) in rate per cent.
4. A storekeeper on the 1st March, 1894, bought goods amounting (at catalogue prices) to \$840, on which he was allowed successive discounts of  $33\frac{1}{3}$  per cent. and 5 per cent. The account is payable in 60 days, after which time interest is to be charged at 7 per cent. per annum. On the 1st June, 1894, he paid \$100. How much is due on the 1st July, 1894?
5. A farmer bought 80 acres on the 1st Dec. 1893, for \$3600, payable one-third cash, one-fourth on the 1st of February, 1894, and the balance on the 1st June, 1894. Find the equated time for the payment if made in one sum.
6. M invested money in 3 per cent. consolidated stock at 95 and an equal sum in factory stock at 190, paying an annual dividend of 7 per cent. From the latter he received ten dollars a year more than from the former. How many fifty-dollar shares of factory stock did he purchase?
7. A circular cistern is to contain 66 barrels and to be 6 feet deep. Find the diameter of the excavation allowing for a brick lining 5 inches thick. (Note.—1 bbl. =  $31\frac{1}{2}$  gal.; 1 cu. ft. =  $24\frac{2}{3}$  quarts.)
8. In a granary there are four bins, each 10 ft. long and 5 ft. wide; how high must they be boarded in front to be capable of holding 860 bushels? (See note after No. 7.)
9. Find the number of cubic feet in a hewn log, 12 inches square at one end and  $9\frac{1}{4}$  inches square at the other, its length being 27 feet.

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